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The acquisition of English infinitival sentential complementation by adult speakers of Arabic

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by

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TABLE OF CONTENTS

		Page
1.	INTRODUCTION	1
2.	REVIEW OF THE LITERATURE	3
	2.1. Contrastive and Error Analysis	4
	2.2. Studies on Order of Acquisition	9
	2.3. The Relationship between English Proficiency and Years of Language Study	12
3.	SENTENTIAL COMPLEMENTATION	16
	3.1. English Sentential Complementation	16
	3.2. Arabic Complementation	27
	3.3. Second Language Acquisition Studies on English Sentential Complementation	30
	3.4. The Purpose of the Present Study	37
4.	RESEARCH DESIGN	41
	4.1. The Subjects	41
	4.2. Testing Procedure	41
	4.2.1. Coding procedure for multiple choice	45
	4.2.2. Data analysis	47
5.	RESULTS AND DISCUSSION	53
	5.1. Rankings	53
	5.2. Correlations in Rankings	55
	5.3. Sequential Relationships	57
	5.4. The Influence of the Type of Elicitation Task on the Students' Results	65

Page

5.5. Environments 76

5.5.1. Verbs which can take only the Infinitive 77
5.5.2. Verbs which can take Infinitive/That 79
5.5.3. Verbs which take Infinitive/Gerund 82

5.6. Complement Preference 85

5.7. The Relationship Between English Proficiency and Years of English Study 94

5.8. Transference 98

6. DISCUSSION AND CONCLUSION 103

6.1. Is There an Invariant Hierarchy of Difficulty for the Acquisition of English Infinitival Sentential Complementation by Adult Speakers of Arabic? 104

6.2. If Invariant, How Does the Invariant Ordering for the Adult Arabic Speakers Compare with Other Language Groups Learning English Infinitival Complementation? 106

6.3. What Effect Does the Environment (NP or END) Have on the Difficulty of Each Category? 108

6.4. With Those Verbs Which Can Take the Infinitive Plus One Other Complement, Is One Complement Preferred Over the Other? 109

6.5. Is There a Decrease in Complement Selection Errors as the Years of Language Study Increase? 109

6.6. What Role Does Transfer Play, Either in the Selection of a Correct Complement or in Preference? 110

6.7. Do the Rankings of Difficulty Vary from One Individual to the Other? 111

6.8. Conclusion 113

Page

7. BIBLIOGRAPHY 115

8. ACKNOWLEDGMENTS 120

9. APPENDIX A. THE TEST 121

10. APPENDIX B. INDIVIDUAL SCORES 134

10.1. Individual Scores in the Free Part of the Test for the Four Levels 134

10.2. Individual Scores in the Multiple Choice Part of the Test for the Four Levels 138

10.3. Individual Scores for the Four Levels in the Whole Test 142

11. APPENDIX C. SPEARMAN RANK CORRELATION MATRICES FOR THE FOUR LEVELS 146

11.1. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level One 146

11.2. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Two 154

11.3. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Three 162

11.4. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Four 170

1. INTRODUCTION

The purpose of this study is to determine the difficulties encountered by Arabic speakers in the acquisition of the subcategorization features of infinitive verbs (i.e., verbs which can take the infinitive complement). Subcategorization features are used in the correct selection of the complement-type each verb allows.

A written test was designed; it consisted of five different tasks and seventy-one questions which included six infinitival subcategorization categories, and some distractors using both verbs which allow only the gerund complement and verbs which allow only the that-complement. This test was administered to one hundred Arab students at King Saud University, Riyadh, Saudi Arabia in April 1983. A cross-sectional analysis was done to determine if there was an invariant learning sequence of acquisition for the infinitival complement structures by adult native speakers of Arabic.

Studies in second language acquisition have shown recently that there is an invariant order for morphemes (Dulay and Burt, 1973, 1974a; Bailey et al., 1978). There are three other studies on sentential complementation which have been done. Anderson (1976) investigated the acquisition of English sentential complement structures by adult Puerto Rican students. Butoyi (1978) did a study to determine

whether there was an accuracy order of English sentential complements common across adult native speakers of Spanish, Persian and Japanese. Schwarte (1982) investigated the acquisition of English sentential complementation by adult speakers of Finnish. In this study, the hierarchy of difficulty for different subcategorization features of infinitival verbs was compared with those of the other studies in order to determine whether or not the invariant difficulty sequences are comparable among the various language groups.

The one hundred students included in this study were all English majors. They were made up of first year students, second year students, third year students and fourth year students, with twenty-five students in each level. The reason behind including different years of studying English was to see if errors decrease when the number of years of studying English increases.

Chapter 2 of this study presents a review of the literature. In Chapter 3, the purpose of the study is outlined and a brief contrastive analysis between English and Arabic sentential complementation is presented. The research design, testing procedures, and method used in the data analysis are presented in Chapter 4. Chapter 5 contains the results and discussion; a summary and conclusion are given in Chapter 6.

2. REVIEW OF THE LITERATURE

Second-language teachers are concerned with the cause and elimination of errors in second-language classes. Until recently, most linguists believed that errors were due to interference from the mother tongue. On this basis, they placed a great deal of importance on contrastive analysis (CA). CA involves looking for the similarities and differences between two languages so as to be able to predict difficulties. Recent investigations of the errors made by second-language learners have revealed surprising statistics. Although some errors are the direct result of native-language interference, the percentage is not so large as had been believed.

Because the study undertaken here is concerned with both contrastive and error analysis, it will be relevant to review some of these studies. This is done in the first section of this chapter. Because such studies have primarily focused on the errors made by subjects learning a second language in order the determine the invariant orders of acquisition for different structures, the second section of this chapter will review some recent studies on the order of acquisition. Another issue in second language has been the relationship between English proficiency and the number of years of language study. The third section will discuss this relationship.

2.1. Contrastive and Error Analysis

During the 1950s, B. F. Skinner viewed language acquisition essentially as the formation of habits or as the result of the individual's learning a large number of discrete elements and then gaining the ability through practice to manipulate these elements in a rapid and automatic fashion. By 1964, the shortcomings of Skinner's theory had been widely publicized. Generative linguistics noted that language could not be neatly cut into discrete units, that language was a hierarchical structure and that to attain linguistic behavior, an individual needs more than rote repetition.

Although there are some problems with this behavioristic view of language, it did lead to interesting research in second language acquisition. One area was the identification of potential difficulties in the language learning process. Researchers tried to predict problems by systematically comparing the learners' mother tongue with the target language. They claimed that this would enable the linguist to predict the difficulties a learner would encounter: those elements in the target language that are similar to those in the learner's native language will be simple for him to learn, and those elements that are different will be difficult. This was known as the contrastive analysis (CA) hypothesis.

Numerous studies have been done in which researchers made predictions based on contrastive analysis, but they found that the results of their research had no support for the predictions of the CA. George (1971) found that only one-third of the deviant sentences from second language learners could be attributed to language transfer, a figure similar to that given by Whitman and Jackson (1972) and Brudhiprabha (1972). In an analysis of English errors produced by speakers of a multitude of unrelated languages representing several language families, Richards (1971) noted that there are similar errors regardless of the learner's language background. He called these types of errors intralingual and developmental errors.

> Intralingual errors are those which reflect the general characteristics of rule learning, such as faulty generalization, incomplete application of rules, and failure to learn conditions under which rules apply. Developmental errors illustrate the learner attempting to build up hypotheses about the English language from his limited experience of it in the classroom or textbook. (Richards, 1971, p. 206)

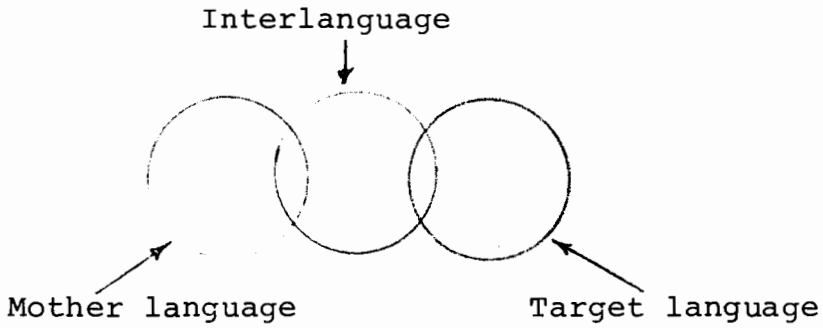
Like the first language learner, the second language learner tries to derive the rules behind the data to which he has been exposed, and may develop hypotheses that correspond neither to the mother tongue nor to the target language. In an experiment on learning Russian word order, Torry (1966) found that English subjects sometimes adopted a consistent

word order different from that in either Russian or English.

By the late 1960s, second language learning had begun to be examined in much the same way that first language learning had been studied for some time: the learner was looked upon not as a producer of imperfect language full of mistakes, but as an intelligent and creative being proceeding through logical, systematic stages of acquisition.

> No one expects a child learning his mother tongue to produce from the earliest stages only correct forms. We interpret his "incorrect" utterances as being evidence that he is in the process of acquiring language, and it is the "errors" which provide the evidence of the stage of his development. In the same way, a second language learns by a gradual process of trial and error and hypothesis testing, the learner slowly and tediously succeeds in establishing closer and closer system to that used by native speakers of the target language. (Corder, 1967, p. 165)

A number of terms have been used to describe the perspective which stressed the legitimacy of the learner's second language system. The best known of these terms is "interlanguage" (Selinker, 1972). An interlanguage is another name for the learner's language; it is the system used by the language learner when producing utterances in a target language. This system contains elements of the target language, elements of the mother language and elements which belong to neither system but may be a mixture of the two.



Nemser (1971) referred to the same general phenomenon in second language learning but stressed the successive approximation to the target language in his term "approximative system". Corder (1971) used the term "idiosyncratic dialect" to connote the idea that the learner's language is unique to a particular individual, and that the rules of the learner's language are particular to the language of that individual alone. He also used the term "transitional competence" which borrows the notion of "competence" from Chomsky and emphasizes that the learner possesses a certain body of knowledge which we hope is constantly developing, which underlies the utterances he makes and which it is the task of the applied linguist to investigate. While each of these designations emphasizes a particular notion, they share the concept that the second language learner is forming his own self-contained linguistic system. This is neither the system of the native language nor the system of the target language, but instead, falls between the two (i.e., intralingual).

Researchers and teachers of second language soon come to realize that the mistakes a person makes in this process of constructing a new system of language needed to be analyzed carefully, for they possibly held in them some of the keys to the understanding of the process of second language acquisition.

> A learner's errors, then, provide evidence of the system of the language that he is using (i.e. has learned) at a particular point in the course . . . they provide to the researcher evidence of how language is learned or acquired, what strategies or procedures the learner is employing in his discovery of the language . . . . (Corder, 1967, p. 167)

Corder (1981) pointed out that every language learner has a language at all points of his learning career, and that we can describe his language:

> That his language is changing all the time, that his rules are constantly undergoing revision is, of course, true and merely complicates the problem of description but does not invalidate the concept of "a learner's language". (Corder, 1981, p. 56)

Corder suggested that the study of the learner's language is similar to the error analysis. The only difference that he can see lies in which is being compared. In error analysis, we compare the learner's language with the "whole" of the target language, i.e., all aspects and rules of the target language. In the study of the learner's language, we see the relation of what has already been taught so far to what the learner's knowledge is at the same point.

What is concluded from this section is that the number of errors due to transfer is quite small. So, the claim that the principal barrier to second language acquisition is the interference of the first language system does not seem to hold. This would tend to support the error analysis hypothesis that errors from all sources, not only negative transfer from the first language, be considered.

2.2. Studies on Order of Acquisition

Many studies have already been done to determine the order of acquisition of morphemes. The studies support the notion of universal language learning strategies. Roger Brown (1973) made a longitudinal study of morpheme acquisition in first language learners. He found that the order of acquisition of fourteen grammatical morphemes in English is invariant in the speech of three children, Adam, Eve, and Sarah. Despite differing rates of first language acquisition, Brown found evidence for a uniform developmental course that all children take in learning English. Similar study was made by de Villiers and de Villiers (1973). Speech samples were taken from twenty-one children. After scoring the presence or absence of the same fourteen grammatical morphemes as Brown studied in linguistic and nonlinguistic "obligatory contexts" (i.e., contexts require the presence of the morpheme), they found a significant correlation between their rank orderings and those of Brown's.

Dulay and Burt (1972, 1974a, 1974b) have done three studies to discover the universal second language learning strategies common to all children. Dulay and Burt indicated that children reconstruct English syntax in similar ways, regardless of first language background. They found a great similarity in the types of errors that Spanish, Chinese, Japanese, and Norwegian-speaking children make while still learning English. This is due to what Dulay and Burt call "creative construction":

> The process in which children gradually reconstruct rules for speech they hear, guided by universal innate mechanisms which cause them to formulate certain types of hypotheses about the language system being acquired, until the mismatch between what they are exposed to and what they produce is resolved. (Dulay and Burt, 1974c, p. 37)

Dulay and Burt (1973) found that the acquisition sequence of eight structures was the same for three different groups of children: Chicano, Mexican, and Puerto Rican children. Plural morpheme (-s) was acquired first, followed by progressive morpheme (-ing), copula (is), articles (a, the), auxiliary (is), irregular past (ate, gave), third person singular morpheme (-s), and possessive morpheme (-'s).

In 1974, Dulay and Burt (1974a) compared Chinese and Spanish-speaking children's acquisition order for eleven English "functors." The functors include the original eight structures in their 1973 study, plus pronoun case (nominative and accusative), regular past morpheme (-ed), and long plural

morpheme (-es, e.g., the -es in houses as opposed to the "short" plural morpheme -s in girls). They found that the sequences of acquisition of eleven functors obtained for Spanish and Chinese children are virtually the same although the grammar of the eleven functors is widely different in Chinese and Spanish. Chinese does not express the copula at all, while Spanish does. Yet both Chinese and Spanish children acquire copula at about the same point in the sequence. Their conclusion is that it is the L2 system, rather than the L1 system, that guides the acquisition process.

In 1978, Bailey et al. made a study of the adult learner's acquisition of morphemes. They replicated the procedure used by Dulay and Burt for child learners to compare the adult order of grammatical morpheme acquisition to that for children. Seventy-three adult subjects (ages seventeen to fifty-five) were tested. The subjects differed in the amount of instruction, exposure to English, and mother tongue. The researchers found that there was no significant difference in the order of morpheme acquisition among adults. They also found that the order agreed to that found by Dulay and Burt. Since subjects with different first languages performed similarly, the results are also consistent with findings that errors in second language learning are not all the result of interference from the first language. This indicates, as they noted, that adults use common strategies for second

language learning.

Another study by Larsen (1978) included five tasks--reading, writing, listening, initiating and speaking. The Bilingual Syntax measure, an instrument devised to elicit natural spontaneous speech data, was administered to twenty-four adult learners of ESL. There were six subjects from each of four native-language backgrounds--Arabic, Japanese, Persian and Spanish. The results of this study showed that language background did not have a significant effect on the order in which ESL learners acquire English morphemes.

Although all these morpheme studies supported the notion of universal language learning strategies, Rosansky (1976) brought up the question of whether the individual subject's ranks for morphemes correlate. Rosansky examined a one-hour taped session for each of her six subjects (untutored Spanish speakers learning English: two children, two adolescents, and two adults). Rosansky observed that when she compared the individual subjects' ranks for morphemes in her study, they did not correlate significantly, nor did the individual orders of subjects paired by age correlate. With such variation among subjects, Rosansky questions whether the language performance of the populations is being accurately described.

This question was also investigated by Schwarte (1982). She examined forty-three students studying English at the University of Jyväskylä, Finland. She also found that rankings

of difficulty for English sentential complementation varied from individual to individual. Such findings, as she said, add a confirmation to the doubts raised by Rosansky (1976) and others about the validity of equating group rankings with individual rankings. She also noted that researchers must be wary of making claims about the language acquisition process based upon cross-sectional group data.

2.3. The Relationship between English Proficiency and Years of Language Study

It has been believed that there exists a positive and strong relationship between the length of foreign or second-language study and a student's level of proficiency in the target language.

Saegert et al. (1974) did a study in which they investigated and examined the relationship between measured English-language proficiency, years of English-language study and the use of English as a medium of instruction. All the subjects were native speakers of Arabic: there were 114 Egyptian and 71 Lebanese university students. The results of multivariate regression analyses indicated no systematic relationship between years of EFL study and English proficiency. On the other hand, students who attended classes in which some Indo-European language was used as the medium of instruction achieved greater EFL proficiency than students who did not, regardless of the number of years they had studied English

as a formal classroom subject.

Godfrey (1980) did a study in a discourse analysis of tense in adult ESL monologues. He took speech samples from twenty adult ESL students at the University of Michigan English Language Institute. Four students at each of five different levels of proficiency were selected on the basis of their scores on a placement test taken upon their arrival at the ELI. A common assumption is that the number of errors decreases as the amount of ESL instruction increases:

> In examining adult second language learners' errors on any particular linguistic element, it seems reasonable to expect beginning learners to have the least control over the element and thereby, the most errors in its formation and use. One should also expect learners at each successive level of increased proficiency to have greater control over the element and thus fewer errors in its formation and use. (Godfrey, 1980, p. 92)

Godfrey found that a gradual decrease in tense errors did not always occur because of an increase in proficiency level. As the researcher says, many sources are found to produce the unexpected error rates such as avoidance, variation of topic and genre.

Schachter (1974) examined the errors of advanced learners in the formation of relative clauses in written compositions. She found that even though some of the learners could not control relative clauses, they had low error rates. She found that this was due to avoidance of difficult forms.

In sum, what we may conclude from the three studies

mentioned in this section is as follows. First, it seems that there is no relationship between English proficiency and years of language study. Second, certain learners may appear to have no difficulty with a certain structure, while actually they may be avoiding trying to produce it for fear of making an error. Thus, the notion of avoidance strategy adds an important qualification to the error analysis hypothesis. Thus, any study that investigates the acquisition of grammatical forms should also consider avoidance. The relationship between years of study and acquisition needs further investigation.

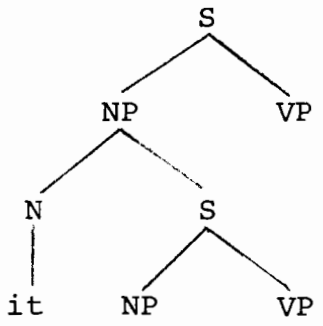
3. SENTENTIAL COMPLEMENTATION

The research undertaken here is an investigation to determine the difficulties encountered by Arabic speakers in the acquisition of English infinitival sentential complementation. Since there will be a section in this study dealing with the role of mother tongue interference in causing errors, a limited analysis of English complementation and Arabic complementation will be presented here. It is not within the scope of this work to do a comprehensive analysis; this analysis is provided only as a reference for the discussion of native language interference, which will be discussed later. The second section in this chapter will present the findings of other studies on complementation. The last section will include the purpose for undertaking the research, as well as some relevant questions which will be answered in this study.

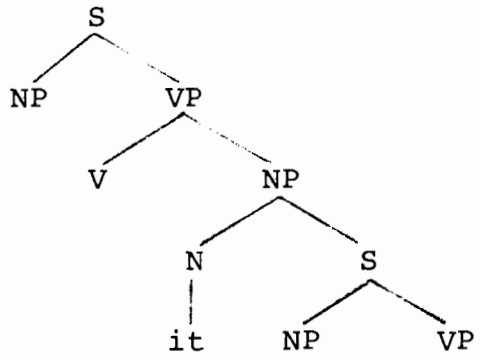
3.1. English Sentential Complementation

Within the generative transformational framework (Chomsky, 1957, 1965), complementation is a process whereby sentences are embedded inside other sentences. Complements may be of two types: noun phrase or verb phrase. Noun phrase complements are those complements embedded in the noun phrase (i.e., subjects). Verb phrase complements are those embedded in the verb phrase (i.e., object).

(1) Noun Phrase Complement:



(2) Verb Phrase Complement



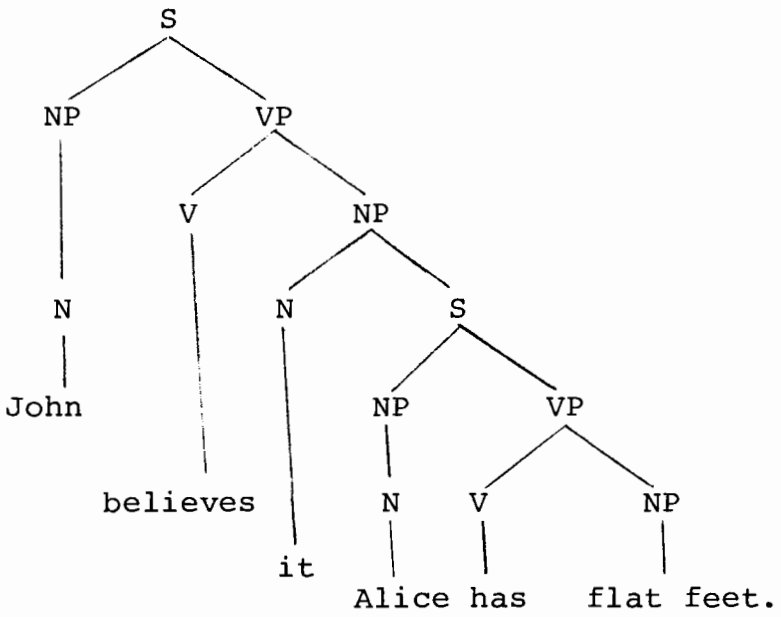
As can be seen in the previous diagrams, "it" exists in the deep structures for all complements. Lakoff (1968) argued for its presence, and its presence accounts for sentences such as (a) and (b):

(a) It is likely to rain.

(b) I don't like it that you come home so late.

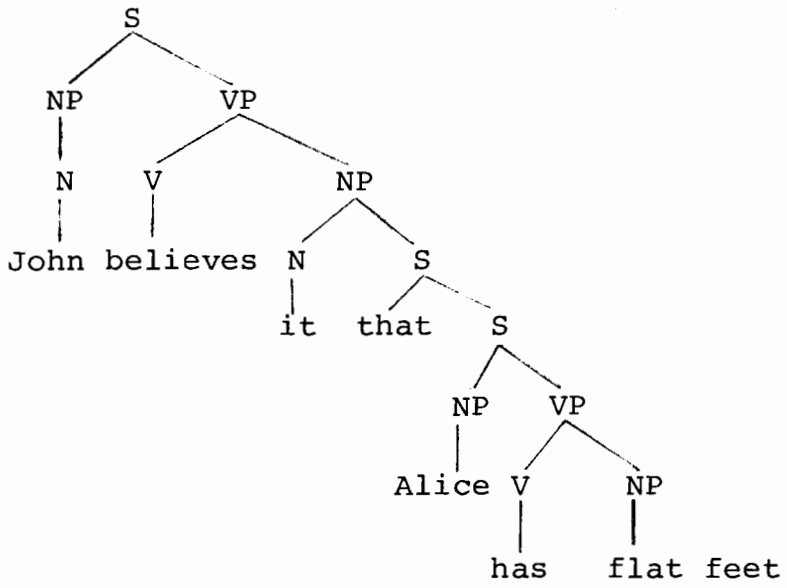
That-complements are of the form "John believes that Alice has flat feet". In generative-transformational grammar, this sentence would have the deep structure such as tree Diagram (3).

(3)



To this deep structure, the <u>that</u>-complement rule is applied, yielding the structure in tree Diagram 4.

(4)



The that-complementizer (Rule (1)) removes the sentence boundaries of the embedded sentence and inserts that.

Rule (1): Complementizer Placement

S.D.	S	it	#	S	#	X_2
S.I.	1	2	3	4	5	6
S.C.	1	2	0	that +4	0	6

All complements in the deep structure, as Lakoff argues, undergo this complementizer placement rule.

The major difference between for-complements and that-complements, as C. L. Baker (1978) states, is that in the former, the first verbal element is not marked for tense, but instead is preceded by the infinitive marker to.

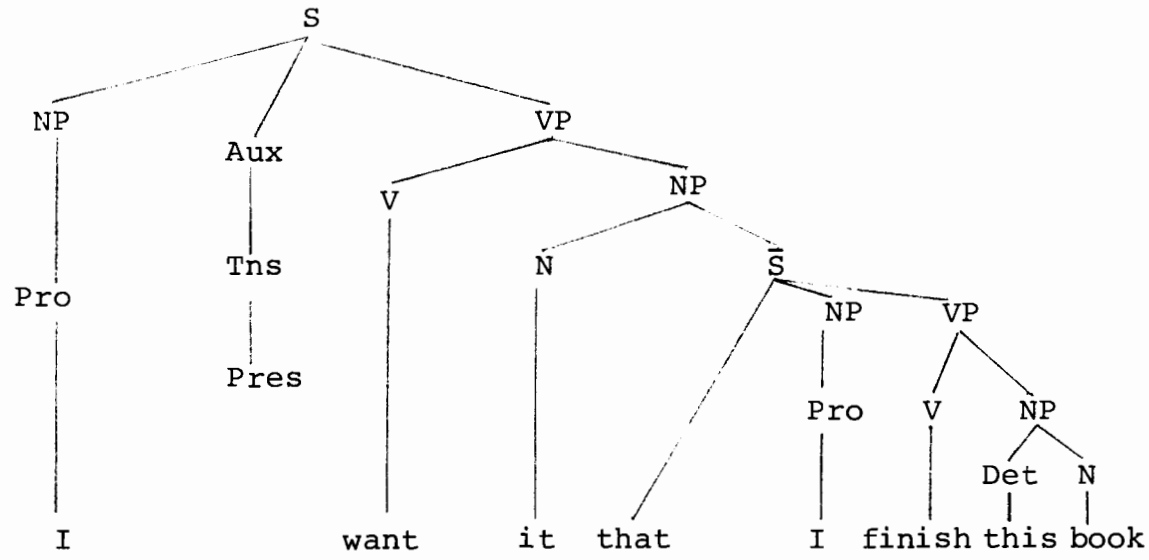
The following rule is the complementizer change rule which verbs that appear with infinitival and gerundive complements undergo after the application of the complementizer placement rule.

Rule (2): Complementizer Change (for-to)

S.D.	X_1	that	NP	VP	X_2
S.I.	1	2	3	4	
S.C.	1	0	for +3	to +4	5

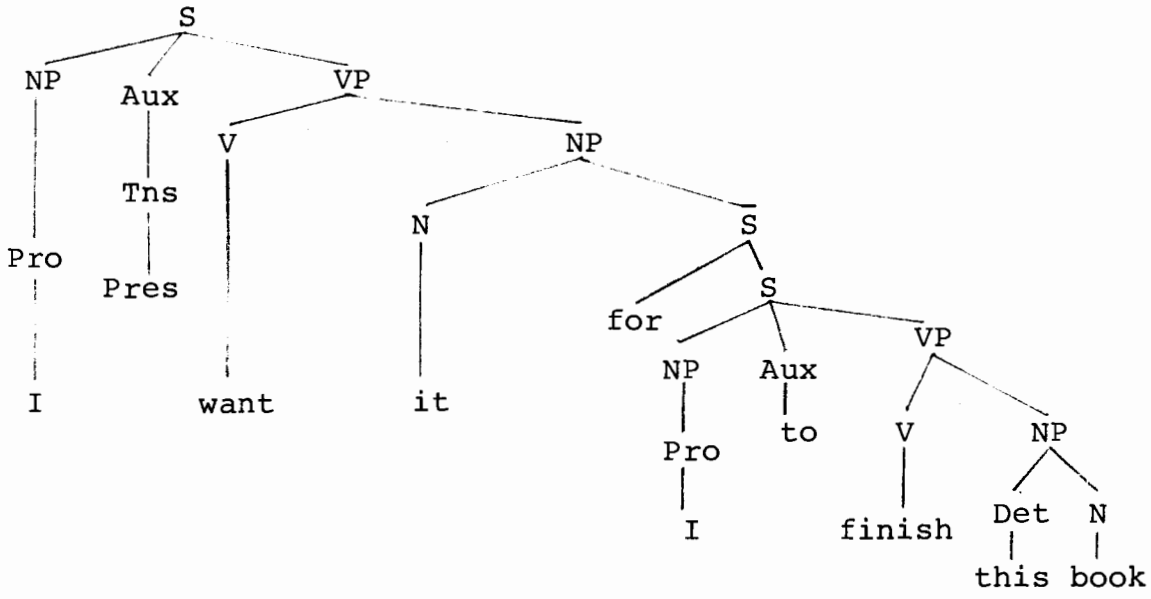
Tree Diagram (5) represents the structure before the application of the complementizer change rule.

(5)



Tree Diagram (6) is created after the application of for-to complementizer change rule.

(6)



After the complementizer placement and complementizer change rules apply, other transformation rules apply to the structure derived: identical-NP deletion, it-substitution, extraposition, it-deletion, and complementizer deletion.

The identical-NP deletion rule deletes the subject of the embedded sentence when it is co-referential with the subject in the matrix sentence.

Rule (3): Identical-NP Deletion

S.D. NP - AUX V - $\bar{S}$[for - $_S$[NP - X]$_S$] $\bar{S}$

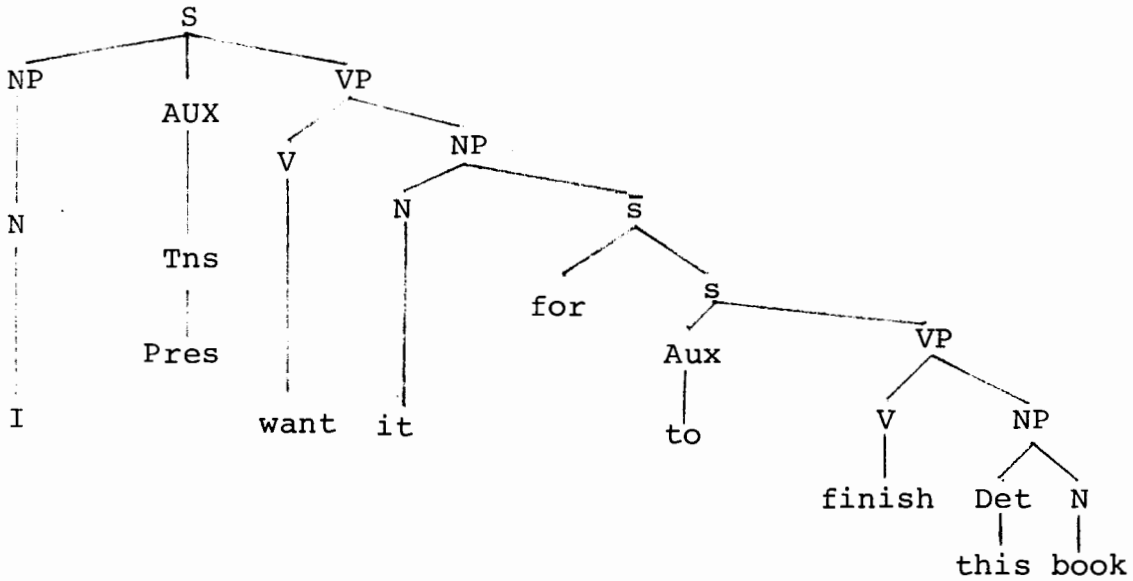
S.I. 1 2 3 4 5

Condition: 1 = 4

S.C. 1, 2, 3, 0, 5 (obligatory)

From a structure like Diagram (6), we would derive Diagram (7) after the application of identical-NP deletion rule.

(7)



It-substitution substitutes "it" for the subject of the embedded sentence, after this subject becomes the subject of the matrix verb.

Rule (4): It-Substitution

S.D.	X_1	it	for	NP	VP	X_2	NP	VP
S.I.	1_I	2_I	3_I	4_I	5_I	6_I	1_{II}	2_{II}

Conditions: 2-3-4-5 is an NP

3-4-5 is an S

4-5 is an S

S.C. Substitute 4_I for 2_I

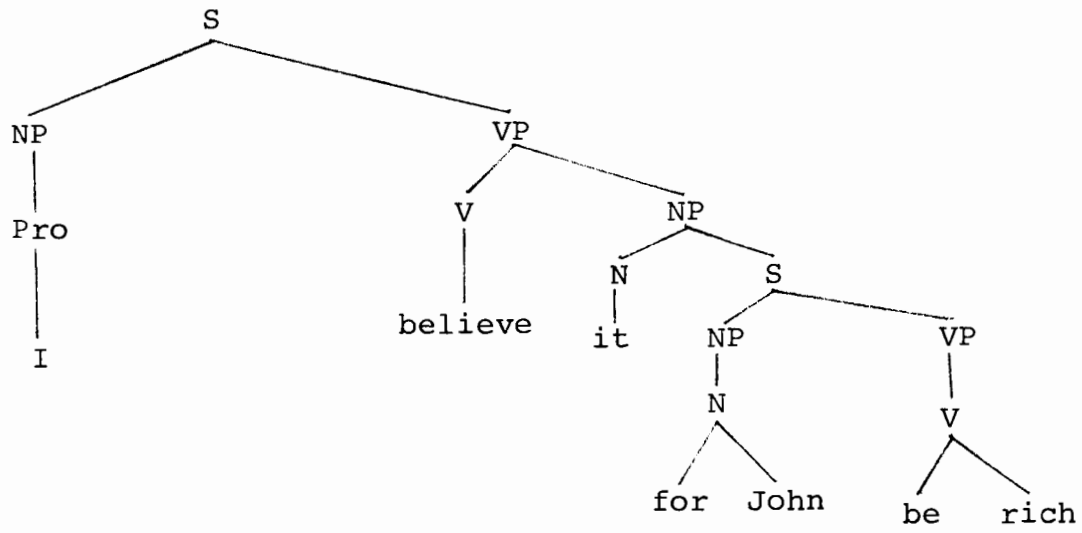
Delete 4_I

Adjoin 3_I-4_I-5_I to 2_I

Delete 3_I-4_I-5_I

Diagram (8) illustrates the structure of the object complement before It-Substitution applies, and Diagram (9) illustrates the structure after the application of the rule. Diagram (10) illustrates the structure of the subject complement before the rule's application and (11) represents the structure after the rule has applied.

(8)


S
NP
VP
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NP
I
believe
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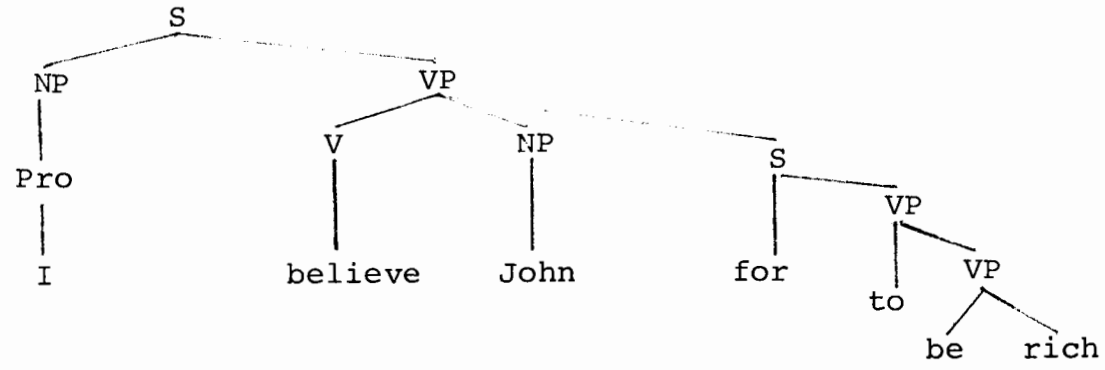
S
it
NP
VP
N
V
for
John
be
rich

(9)


S
NP
VP
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I
believe
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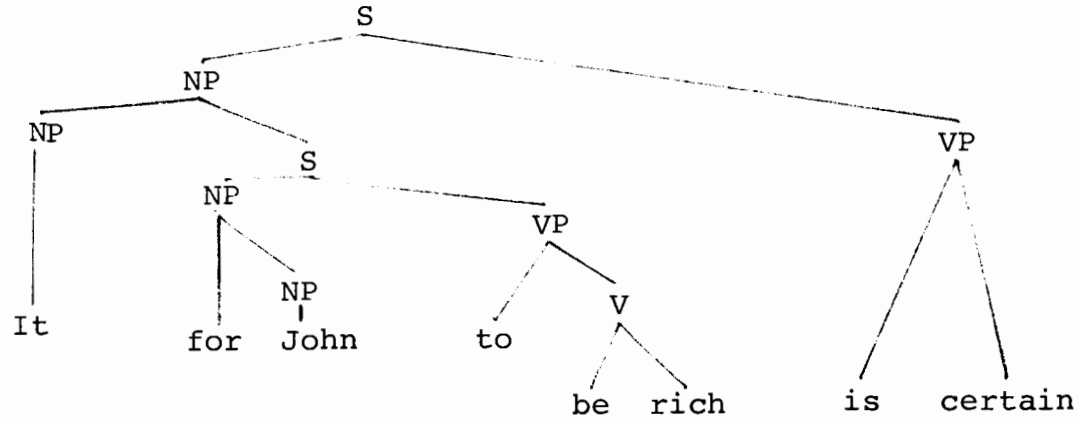
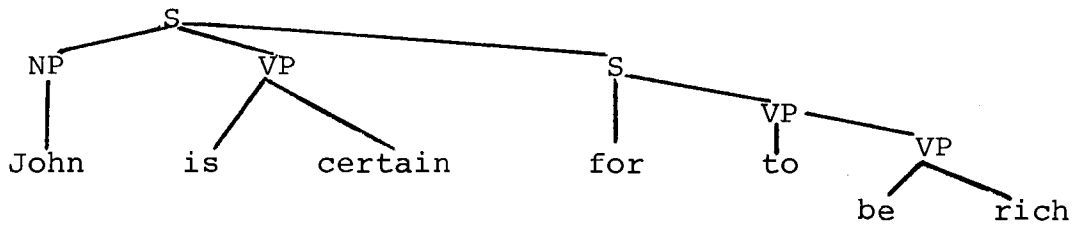
for
VP
to
VP
be
rich

(10)


S
NP
NP
S
VP
It
NP
VP
NP
for
John
to
V
be
rich
is
certain

(11)



The complementizer deletion rule, which will be discussed later, will delete the "for."

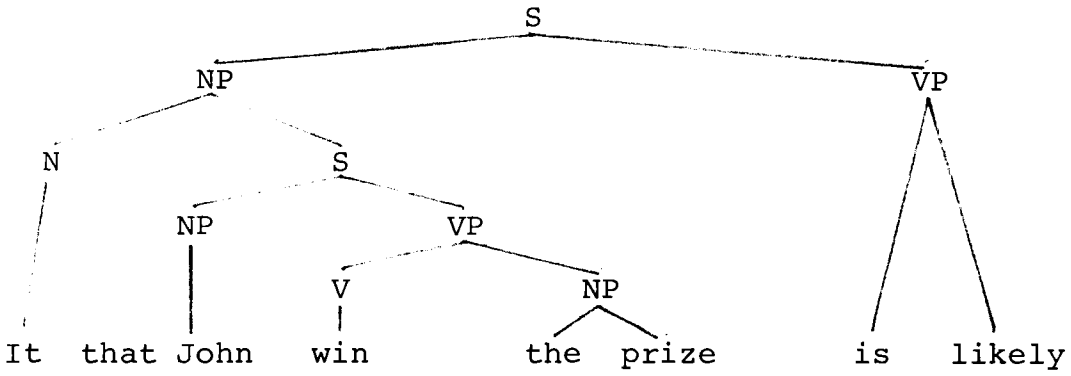
Extraposition moves an embedded sentence out of the NP in which it originates and to the end of the sentence, leaving the "it" in its original position.

Rule (5): Extraposition

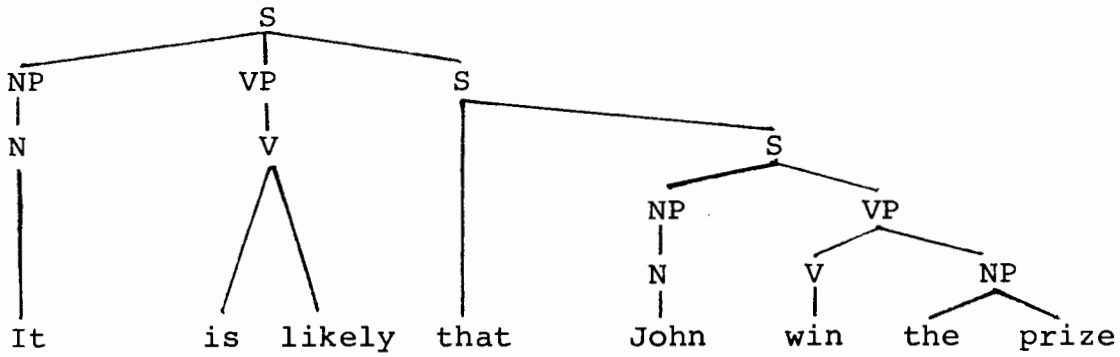
S.D.	X_1	it	S	X_2
S.I.	1	2	3	4
S.C.	1	2	4	3

Thus, from Diagram (12) we would derive Diagram (13) through extraposition.

(12)



(13)



Extraposition is usually optional but in some cases it is obligatory. "It" is never found preceding the complementizer, that, in subject complements and very rarely is it found preceding object complements. If extraposition has not applied, it-deletion then operates to delete the "it" preceding the complementizer.

Rule (6): It-deletion

S.D.	X_1	it	S	X_2
S.I.	1	2	3	4
S.C.	1	0	3	4

That-deletion accounts for the optional deletion of "that" when it is immediately preceded by a verb. For a few verbs, it is indicated in the lexicon that this rule of deletion cannot operate.

Rule (7): That-deletion

S.D.	X_1	V	that	S	X_2
S.I.	1	2	3	4	5
S.C.	1	2	0	4	5

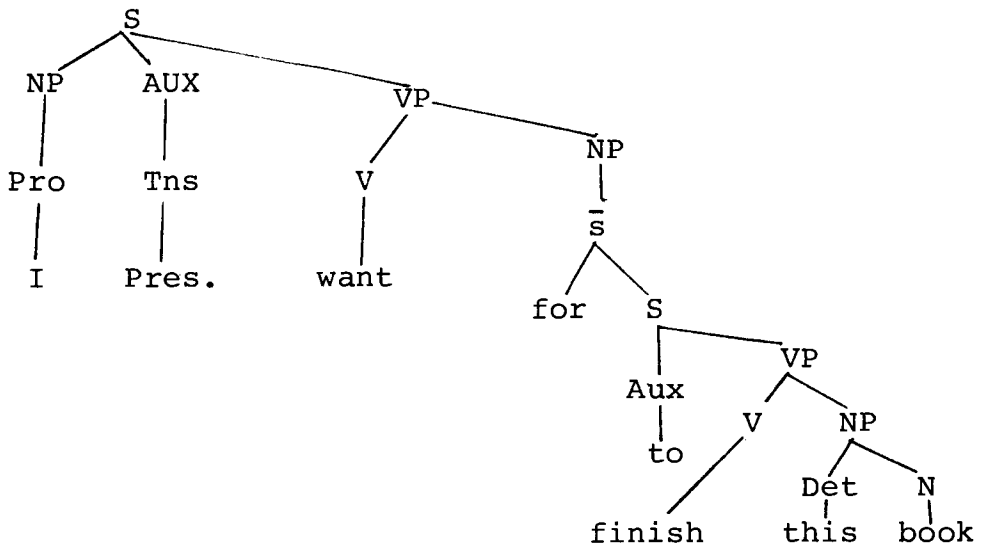
An additional adjustment must be made by transformational rules to have the correct surface structure. Complementizer deletion rule deletes the "for" before a verb after the subject has been removed.

Rule (8): Complementizer Deletion

S.D.	X	for	AUX	y	
S.I.	1	2	3	4	
S.C.	1	0	3	4	(obligatory)

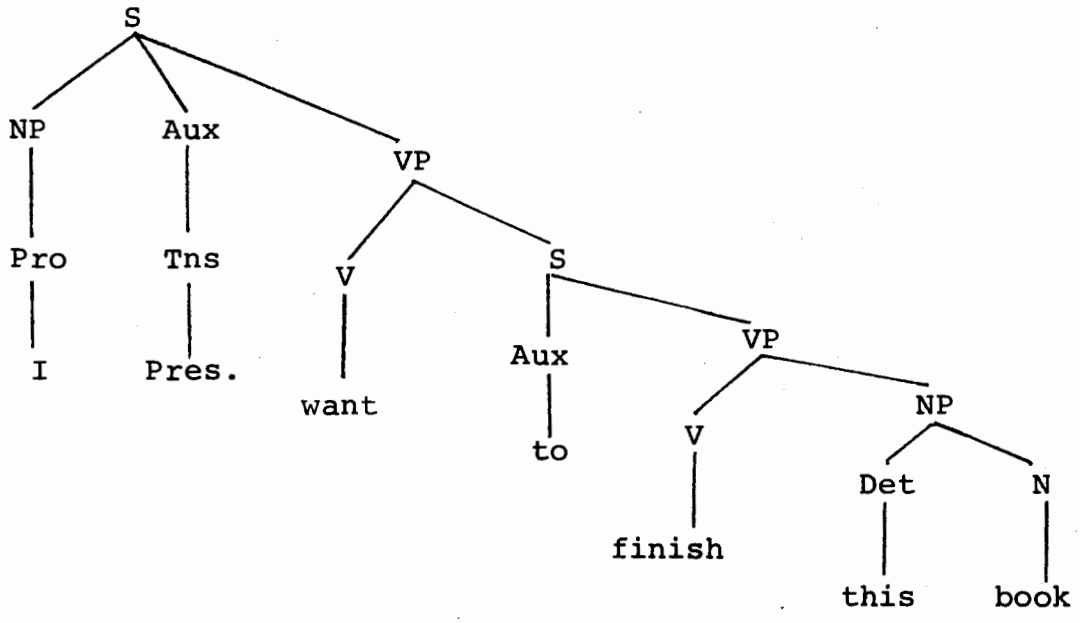
Thus, from Diagram (7), we get Diagram (14) after the it-deletion rule has applied. To Diagram (14), the complementizer-deletion rule is applied and the result is Diagram (15).

(14)



We would derive Diagram (15) through complementizer deletion:

(15)



3.2. Arabic Complementation

There are fifteen forms of Arabic verbs derived from the basic trilateral root, i.e., their stem contains three radicals (consonants or semivowels). Quadrilateral roots, i.e. roots containing four consonants, also occur in Arabic, but the majority of the verbs in modern literary Arabic are trilateral. The root of any verb in Arabic can be known by giving the past tense of this verb, e.g.,

Past: kataba كَتَبَ ("he wrote")

The three radicals are: k-t-b

The three radicals plus the formative vowel patterns of the third person singular of the perfect form (i.e., -a-a-a, -a-i-a, -a-u-a) are used as the root or base on which all the other forms are built. This form is also

described as the ground or first form of the verb. The English equivalent of the ground form is the infinitive. The difference between the Arabic ground form and the infinitive in English is that the English infinitive means "a verb which is not inflected for a person or a tense". The ground form of the verb in Arabic is inflected because Arabic is an inflected language. Uninflected verbs do not exist in the Arabic language. From the ground form of the verb, other forms which express various modifications of the idea conveyed by it are derived in different ways. According to the Arab grammarians and Arabicists (Wright, 1967; Thatcher, 1943; Haywood, 1965), the derived forms are fifteen in number. A root takes about fourteen forms, each with a different function. One of them is the nominalized form of the verb, i.e., the gerund in English.

In English, there is what we call the "infinitive of purpose":

(1) My purpose is to see the doctor.

(2) I want to see the doctor.

(3) I need to see the doctor.

We do not have an equivalent to this in Arabic. We could use the gerund or <u>that</u>-complement with verbs like "want", "need" or "order":

(4) أريد أن أزور الطبيب ("I want that I visit the doctor")

(5) أريد زيارة الطبيب ("I want visiting the doctor") أن ("that") with the following verb is equivalent in meaning to the maṣdar or infinitive of that verb.

The English gerund has two equivalents in Arabic. The first is called إسم فعل ("ismfiʕl"), which Wright (1967) called a Nomen Verbi. It is also called المصدر ("maṣdar") (Lit. the place whence anything goes forth from where it originates). An example is:

(6) أحب قراءة القرآن ("I like reading the Quran.")

("reading") in the example mentioned above is treated as a gerund. The second equivalent to the English gerund in Arabic is called الحال the ("circumstantial complement"). It is used when referring to the state or condition of the subject or object of an act, or of both, while the act is taking place.

(7) جاء زيدٌ راكباً ("Zeid came riding.")

راكباً ("riding") in the example mentioned above is the gerund. The circumstantial complement is, in relation to the grammatical structure of the phrase to which it belongs, a redundancy, for جاء زيد ("Zeid came") is a complete sentence, without the addition of راكباً ("riding"). The circumstantial complement answers the question كيف ("how") Zeid came--he came riding.

As a conclusion to this part, we may say once again that in Arabic we do not have an infinitive like that which

exists in English (i.e., a verb which is not inflected for a person or a tense). What we have is only the that-complement and the gerund. So, one of the predictions we could state here is that it is possible to find students using the that-complement and the gerund with verbs like "need", "want" and "order" as a result of mother tongue interference, but we expect the gerund to be used more because it is more eloquent, i.e., it is preferred over the that-complement. We may find also a preference for the that-complement and the gerund over the infinitive with verbs that allow two complements, e.g.,

Infinitive/That (promise, expect, tell, plan, etc.)

Infinitive/Gerund (hear, see, start, begin, like, etc.)

The preference of the gerund and the that-complement is expected because these two complements do exist in Arabic but the infinitive does not exist.

3.3. Second Language Acquisition Studies on English Sentential Complementation

Anderson (1976) and Schwarte (1982) have done the most detailed research regarding the acquisition of English sentential complementation by ESL students. Other complementation studies include Hart and Schacter (1976), Anderson (1977), Tagey (1977), Scott and Tucker (1974), d'Anglejan and Tucker (1975), and Butoyi (1978).

Because the study undertaken here is an investigation of the infinitival complements, the following discussion will

concentrate on the infinitival categories in those studies.

Anderson (1976) did a cross-sectional study of 180 students who were students in English classes at the Catholic University in Puerto Rico. All were adult native speakers of Puerto Rican Spanish, ranging in age from seventeen to thirty-nine years. The subjects were of varying levels of proficiency.

The complement structures investigated in the Anderson (1976) study which are relevant to the present study are:

Structure	Example
(1) Infin-NP	I wanted you to leave.
(2) Infin-END	I want to see it.
(3) Infin/that	I decided {to go. / that I would go.}
(4) Infin/Gerund	I heard them {sing / singing} the song.

The following two figures represent the predicted order of acquisition and the actual order of acquisition which she found.

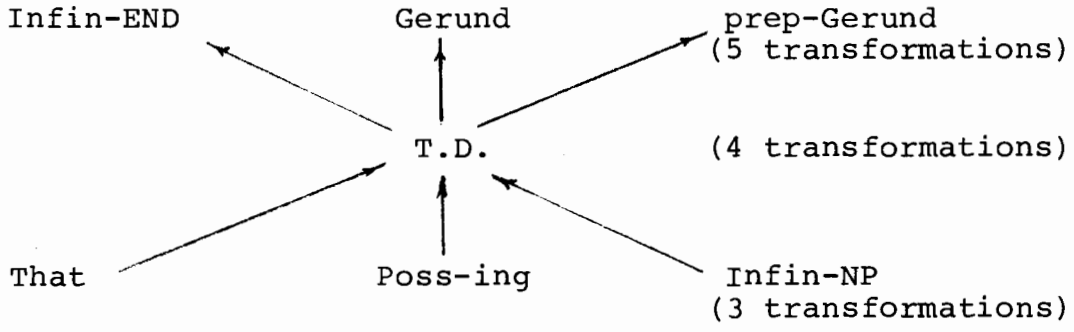


Figure 3.1. Predicted order based on the derivational complexity hypothesis (DCH) (Brown and Hanlon, 1970)

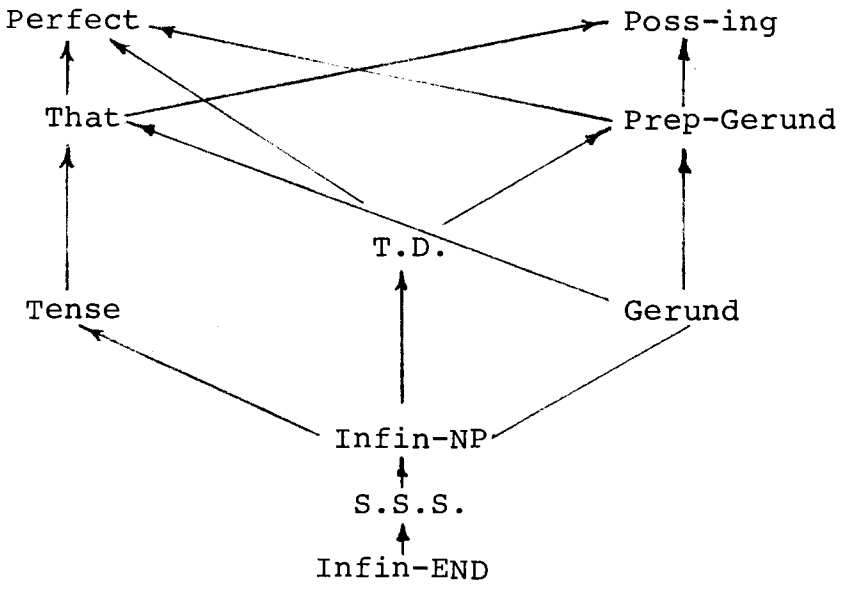


Figure 3.2. Actual order of acquisition (Anderson, 1976)

The order found by Anderson did not match her predicted order based on the Derivational Complexity Hypothesis (DCH) (Brown and Hanlon, 1970), which takes into account the number of transformations involved in each type of process. The Derivational Complexity Hypothesis predicted that Infin-END, Gerund, and Prep-Gerund would all be acquired last because they involve the most transformations. But as Anderson points out, this was not the case. Infin-END is learned first. The Gerund is acquired towards the middle and Prep-Gerund is acquired even later. Anderson mentioned in her study that, although the Infin-END structures are derivationally more complex, they are the easiest structures. A possible reason for this lies in the communicative strategy called

the economy principle, which means that learners tend to produce shorter forms of a structure first.

Anderson also found that the infinitive complement is preferred over the that-complement when the students were given the choice of either infinitive or that. She found also that many students overgeneralized the infinitive complement structures. As she said, this overuse of the infinitive has two possible explanations: the economy principle and language transfer. The economy principle favors the infinitive because it is the shorter complement. Language transfer also favors the infinitive because infinitivalization is more common than other rules of complementation in Spanish; therefore, there might be a tendency to overuse the infinitive in English.

Schwarte (1982) found that the Infin-End ("I want to go"), Infin-End/Gerund ("I like to play baseball/I like playing baseball"), and Infin-NP/Gerund ("I heard the tree fall/I heard the tree falling") were the easiest subcategorization categories for adult Finnish speakers learning English. The hardest subcategorization categories were Infin-NP/That ("Mary expected John to sell his car/Mary expected that John would sell his car"), and Gerund/That ("The little boy admitted breaking the window"/"The little boy admitted that he had broken the window").

Schwarte (1982) and Anderson (1976) have six

subcategorization categories in common. In comparing the orderings in these two studies, Schwarte found that there were six instances of agreement, and nine instances of no agreement, i.e., there was a prerequisite relationship found in Anderson but none found in Schwarte.

Agreement	No Agreement
Infin-End and Gerund	Infin-End and That
Infin-End and Poss-ing	Poss-ing and Infin-NP
Infin-End and Prep + Gerund	Poss-ing and That
Infin-End and Infin-NP	Poss-ing and Gerund
Infin-NP and That	Poss-ing and Prep + Gerund
That and Prep + Gerund	Prep + Gerund and Infin-NP
	Prep + Gerund and Gerund
	Gerund and That
	Gerund and Infin-NP

Schwarte said that a possible explanation might be in the actual verbs used in each category. The categories involved in the no agreement instances are those categories in which one set of verbs was used in her study and another set was used in the Anderson study. Since it was found in the Schwarte study that not all the verbs within a category are of equal difficulty, she first thought that having different verbs for a category could account for not finding more agreement instances. However, It does not appear to be the case that the differences found between the two tests stem

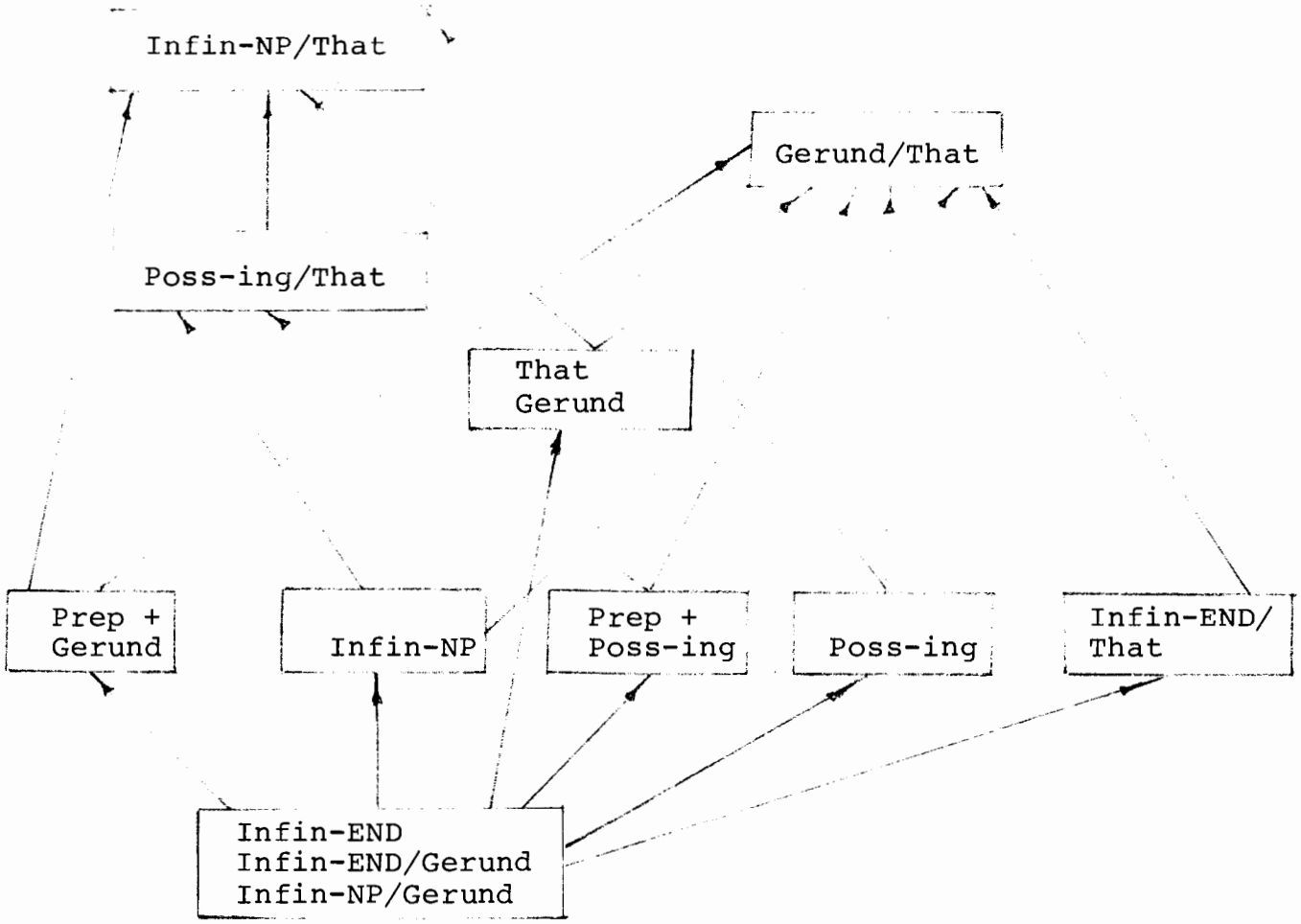


Figure 3.3. Schwarte's (1982) hierarchy of difficulty for subcategorization categories

from the use of different verbs in the categories in common. Although some of the cases involved in the no agreements used different sets of verbs, so did one of the categories involved in quite a few instances of agreement. Therefore, this cannot explain the differences. Another reason could have been that the Finnish subjects were in a more advanced level of proficiency than the Spanish subjects.

A similar study was made by Butoyi (1978) to determine whether there was an accuracy order of English sentential complements common across adult native speakers of Spanish, Perisan and Japanese. For purpose of comparability, Butoyi used Anderson's (1977) translation test. It was found that with one exception, Anderson's results and those of the Butoyi study were significantly similar: that-clause and Infin-END complements were the easiest. Infin-NP complements were more difficult than Infin-END complements. Gerunds were the hardest.

Scott and Tucker (1974) did their study on twenty-two Arabic-speaking students enrolled in a low intermediate intensive English course at the American University of Beirut. Concerning sentential complements, they found that the most common error was the use of the past participle instead of the infinitive after to (e.g., Then they had to went down and tried to push it forward). They also tended to substitute "for + V-ing" or "for + inf" for "to + inf", i.e., instead of

saying to go, they said for going or for go.

Hart and Schacter (1976) also made a study on complementation. The subjects were from a wide range of language backgrounds. They examined compositions written by Spanish, Arabic, Persian, Japanese and Chinese students in order to determine the frequency of complement structures. It was found that infinitive complements outranked the that-complements and gerund complements. Once again, we find Hart and Schacter (1976), like Anderson (1976), positing that the preference for the infinitive complement is due to the economy principle.

In sum, all these studies suggest that the preference and overuse of the infinitive is a common strategy among ESL students, regardless of first language background, which suggests that this phenomenon has nothing to do with mother tongue interference.

3.4. The Purpose of the Present Study

The research undertaken here is an investigation to determine the difficulties encountered by Arabic speakers in the acquisition of the subcategorization features of infinitival verbs (i.e., verbs which can take the infinitive complement). Subcategorization features refer to the correct selection of the complement each verb allows. There are three subcategorization categories for the infinitival complementation: Infin-Only, Infin/That, and Infin/Gerund.

Infin-Only refers to verbs which can only take the infinitive complement. Infin/That means that a verb can take either the infinitive or the that-clause. Infin/Gerund refers to verbs which can take either the infinitive or the gerund. Each category of these three categories has two types of environments, i.e., NP and END:

(1) The NP environment where there is a noun phrase between the main verb and the infinitive, e.g., "I want John to go."

(2) The END environment where there is no noun phrase between the main verb and the infinitive, e.g., "I want to go."

See Table 4.1 for examples of the different subcategorization categories investigated in this study.

The study undertaken here will try to answer the following questions about infinitival complements:

1. Is there an invariant hierarchy of difficulty for the acquisition of English infinitival sentential complementation by adult speakers of Arabic?
2. If invariant, how does the invariant ordering for the adult Arabic speakers compare with other language groups learning English infinitival sentential complementation?
3. What effect does the environment (NP or END) have on the difficulty of each category?

4. With those verbs which can take the infinitive plus one other complement, is one complement preferred over the other?
5. Is there a decrease in complement selection errors as the years of English language study increase?
6. What role does transfer play, either in the selection of a correct complement or in preference?
7. Do the rankings of difficulty vary from one individual to the other?

It is hypothesized that there will be found an invariant ordering for the infinitival subcategorization categories for the Arab subjects, as found in similar studies dealing with complementation (i.e., Anderson, 1976; Schwarte, 1982). It is also hypothesized that the invariant ordering compiled for the Arab subjects for infinitival complementation will be similar to that derived for other language groups, as found in similar studies dealing with different language groups (i.e., Dulay and Burt, 1973, 1974a; Bailey et al., 1978; Krashen et al., 1976). Since Schwarte (1982) included the largest number of different infinitival complementation types, her ordering can be one prediction as to the findings concerning the sequential relationship between categories in the present study (see Figure 3.4).

It is hypothesized that the END environment will be easier than the NP environment, as found by Anderson (1976)

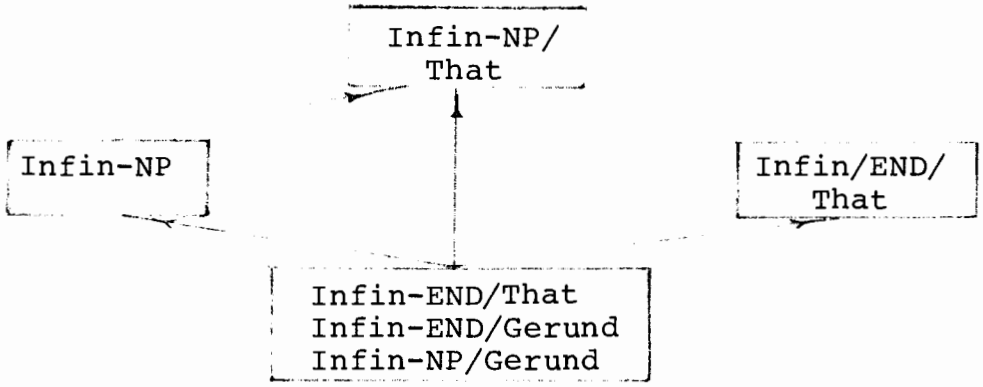


Figure 3.4. Schwarte's (1982) hierarchy of difficulty for infinitival complementation

and Schwarte (1982). It is also hypothesized that the infinitive will be preferred with those verbs which can take the infinitive plus one other complement, based upon the findings of Anderson (1976), Hart and Schacter (1976), and Schwarte (1982). It is hypothesized that there will not be a decrease in complement errors as the years of English language study increase, as found by Saegert et al. (1974) and Godfrey (1980). It is also hypothesized that transfer may play a role, but not a very significant one, in the selection of a correct complement or in preference, as found by Dulay and Burt (1973) and George (1971) in their studies. Finally, it is hypothesized that the ordering derived from the cross-sectional data will not reflect individual orderings, based upon the findings of Rosansky (1976) and Schwarte (1982).

4. RESEARCH DESIGN

4.1. The Subjects

For this cross-sectional study, one hundred undergraduate female students studying English as their major at King Saud University in Riyadh, Saudi Arabia, were tested. These students are made up of four levels: first year, second year, third year, and fourth year, i.e., freshman, sophomore, junior, and senior. Their ages ranged from 19 to 22.

The test was administered to the four levels at King Saud University in one sitting, and the subjects were allowed one hour to answer the questions. Almost all the students finished answering the questions before the end of the hour, so the students were not under time pressure. Twenty-one of the students had lived for a few years in England or U.S.A. and they had studied there for some time. Thirty-three of them had started learning English in their primary school. The rest of the students, i.e., forty-six, started learning English in intermediate school.

4.2. Testing Procedure

A seventy-one item test covering various aspects of complementation was developed and administered in April 1983. Since the focus of this study is to determine the difficulties encountered by native speakers of Arabic in the acquisition of the subcategorization features of infinitival verbs,

sixty-one out of the seventy-one items covered the subcategorization rules of the infinitival complementation. Table 4.1 includes the verbs used in each category and their item numbers: there were six subcategorization categories. For each category there were ten questions in the test. Only the Infin-END/Gerund category has eleven questions instead of ten. There were also ten questions in the test which were used as distractors. Both Anderson (1976) and Schwarte (1982) found a tendency for Spanish and Finnish students to overgeneralize the infinitive. Verbs which take only that-complements and verbs which take only gerundive complements were used as distractors in the test to see if Arab students also overgeneralize the infinitive.

The test consists of two parts: a free part and a controlled part. The first four types of questions comprise the free part. The multiple choice questions make up the controlled part of the test.

Following are the five sections in the test, each with an example of the task involved.

I. Translation from English into Arabic

e.g., I heard the boy singing.

II. Translation from Arabic into English

e.g., أمرني أبي أن أزور عمي

III. Sentence Combining

Ali likes it. Ali reads stories.

Table 4.1. Production subcategorization categories

Categories	Examples	Verbs	Item numbers
Category 1 Infin-NP	He wants her to clean the house today	want	I.1, V.8, V.13, V.26
	The teacher needs them to leave early	need	II.9, III.2, IV.6, V.32
	John ordered me to go home early	order	II.1, V.1
Category 2 Infin-END	The boy wants to see him today	want	II.12, III.5, IV.1, V.18, V.21
	Ali needs to go to the doctor	need	I.4, II.3, V.7, V.16, V.29
Category 3 Infin-NP/ That	Mohammed expected Ali to go to the doctor/ Mohammed expected that Ali will go to the doctor	expect	I.2, II.15
		promise	II.10, V.11
		decide[a]	III.3, V.10
		hope[a]	IV.4, V.3
		tell	V.15, V.30

[a]Although the verbs "decide" and "hope" can take just the that-complement and not the infinitive with an NP, these verbs are included in this category to see whether or not the students are aware of this environment restriction.

Table 4.1. (Continued)

Categories	Examples	Verbs	Item numbers
Category 4 Infin-END/ That	I decided to visit my uncle next Friday/ I decided that I would visit my uncle next Friday	expect	IV.5, V.2
		promise	II.4, III.7
		decide	V.17, V.25
		hope	II.7, V.9
		plan	I.5, V.24
Category 5 Infin-NP/ Gerund	I heard the boy singing/ I heard the boy sing	hear	I.3, II.8, V.6, V.14, V.31
			I.6, II.13, III.4, IV.7, V.27
	I saw the tree falling/ I saw the tree fall	see	
Category 6 Infin-END/ Gerund	I began to read a novel yesterday/I began reading a novel yesterday	begin	II.6, IV.3, V.12
		start	II.14, V.4, V.23
		try	II.11, V.20
	Fatma likes to read/ Fatma likes reading	like	I.7, III.1, V.19
Category 7 That	I think that he will go to school tomorrow	think	II.5, III.5, IV.8, V.5, V.22
Category 8 Gerund	I have finished answering the questions.	finish	II.2
		stop	IV.3, V.4
		enjoy	IV.2, V.28

IV. Fill-in-the Blanks

I saw the girl ———————— (go to school).

V. Multiple Choice

The doctor wants ———————— in bed for three days

a. Ali to stayed

b. That Ali stays

c. Ali staying

d. Ali had stayed

e. Ali to stay

Each item in the multiple choice section had five distractors. The reason for this is that with verbs which can take two complements, i.e., infinitive plus another complement, the guessing probability is too high if there are only four distractors per item. Scott and Tucker (1974), as mentioned in Chapter 2, found that the most common error for Arabic speakers was the use of the past participle instead of the infinitive after to (e.g., to went, to pushed); for this reason, to + participle was included as one of the distractors every now and then to see if the students make the same error.

4.2.1. Coding procedure for multiple choice

A graduated coding for the multiple choice section was used. This coding is similar to that used by Dulay and Burt (1974c). Table 4.2. illustrates the coding procedure for the

Table 4.2. Coding procedure for multiple choice

	Number of complements selected by students	Correctness of response	Coding
Infin-Only verbs	1	NC[a]	0
	1	C[b]	3
	2	2 NC	0
	2	1 C/1 NC	1.5
	3	1 C/2 NC	1
Infin-plus another complement verb	1	NC	0
	1	C	1.5
	2	1 C/1 NC	1.5
	2	2 C	3
	3	2 C/1 NC	2

[a]Not correct.

[b]Correct.

multiple choice section used in this test. Each question in the multiple choice part of the test was worth three points. The reason for assigning three points for each question is that it was found that some students circled three complements for some verbs in the multiple choice section, e.g.,

I hope _____ the exam

(a.) that I pass

b. to passed

c. I had passed

(d.) to pass

(e.) passing

The verb "hope" allows two complements, i.e., the infinitival and the that-complement. It does not take the gerundive complement, so the student got two out of the three possible points.

Each item in the free part of the test was also worth three points. If the student's response was correct, she got three points; if it was wrong, she got zero.

4.2.2. Data analysis

The ordering-theoretic method which was developed by Bart and Krus (1973) was used in this study to determine the order of difficulty. This method is designed to determine logical relationships among items. A binary coding was used to analyze the data. If the subject received a score of 90 percent or higher in a certain category, a "1" is assigned to this category. If it is below 90 percent, a "0" is assigned. The percentages are determined by dividing the number of correct items by the total number of items for that category by an individual.

Individual 1 - Level 1:

Category	Number of correct items/ number of total items	Percent-age	Binary score
Infinitive-NP	10/10	100	1
Infinitive-END	9/10	90	1
Infinitive-NP/That	9.5/10	95	1
Infinitive-END/That	7/10	70	0
Infinitive-NP/Gerund	8/10	80	0
Infinitive-END/Gerund	10/11	90.9	1

The second step in the procedure involves counting the response patterns on all possible pairs of structures for the 25 subjects in each level.

Level 1 Individual Subjects	Infin-NP	Infin-END	Infin-NP/ That	Infin-END/ That
01	1	1	1	0
02	1	1	0	0
:				
04	1	1	1	0
:				
15	0	1	0	0
:				
18	0	0	0	0
19	1	1	1	1
:				
24	1	0	0	0
25	1	1	0	1

The response patterns "11" and "00" for the individuals 01 and 18 do not indicate any sequential relationship.

	Infin-NP	Infin-END
Individual 01	1	1
Indiviudal 18	0	0

The response patterns "10" for individual 24 indicate that he learned Infin-NP before Infin-END and it is called "conformatory". The response pattern "01" for individual 15 indicates that he did not learn Infin-NP before Infin-END but learned Infin-END before Infin-NP. This response pattern is called "disconfirmatory".

	Infin-NP	Infin-END
Individual 24	0	0
Individual 15	1	1

According to the ordering theoretic method developed by Bart and Krus (1973), only the disconfirmatory responses are counted, i.e., "01".

The third step is to count the number of disconfirmatory responses for each possible pair of categories. There are twelve possible pairings for the four categories: (1) Infin-NP and Infin-END, (2) Infin-NP and Infin-NP/That, (3) Infin-NP and Infin-END/That, (4) Infin-END and Infin-NP/That, (5) Infin-END and Infin-END/That, (6) Infin-NP/That and Infin-END/That, plus these pairs in reverse. The number of disconfirmatory responses for each pair is then divided by the number of subjects involved in each level:

Level 1:

	Infin-NP/That and Infin-END/That	Infin-END/That and Infin-NP/That
Disconfirmatory Responses	2	3
Number of Subjects in Study	25	25
Percentage	8.0	12.0

	Infin-NP/That and Infin-END	Infin-END and Infin-NP/That
Disconfirmatory Responses	14	1
Number of Subjects in Study	25	25
Percentage	56.0	4.0

	Infin-END/That and Infin-END	Infin-END and Infin-END/That
Disconfirmatory Responses	15	1
Number of Subjects in Study	25	25
Percentage	60.0	4.0

The ideal would be if for one pair (e.g., Infin-END/That and Infin-END) there were all disconfirmatory responses and for the reverse pair (e.g., Infin-END and Infin-END/That) there were none.

	Infin-END/That and Infin-END	Infin-END and Infin-END/That
Disconfirmatory Responses	25	0
Number of Subjects in Study	25	25
Percentage	100	0.0

This would mean that for all subjects, one item was a prerequisite for the other.

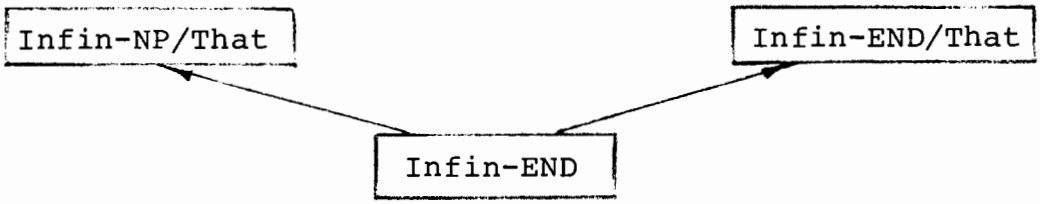
These percentages for the disconfirmatory responses are then put in a matrix:

Matrix of Disconfirmatory Responses

	Infin-NP/ That	Infin-END/ That	Infin-END
Infin-NP/That	--	8.0	56.0
Infin-END/That	12.0	--	60.0
Infin-END	(4.0)	(4.0)	--

Allowing for a tolerance level of 5 percent for performance errors, item pairs that are related in a prerequisite manner can be discerned from the entries of 5.0 or less in the matrix. In other words, when 5.0 or less appears, it means that item pairs are related in a prerequisite manner. Thus, from the matrix above, it can be seen that Infin-END is a prerequisite to Infin-NP/That and Infin-END/That. Because the rest of the entries are more than 5.0, there are no prerequisite relationships between Infin-NP/That and Infin-END/That. From this matrix, a "tree" can be constructed to show

the prerequisite relationship between Infin-END and the other two items.



5. RESULTS AND DISCUSSION

In this chapter, the ordering of the six subcategorization categories based on the percentage of error for students in each level will be presented. Next, a hierarchy of difficulty is established for each level separately and then for the one hundred students in all levels together. The hierarchy of difficulty illustrates the sequential relationships among the six categories. An examination of complement preference and type of error follows. The relationship between English proficiency and years of English study will be presented next. Finally, there will be a discussion of native language transfer.

5.1. Rankings

Table 5.1 presents the percentage of correct responses for the six subcategorization categories for the four levels. Based on this result, Table 5.2 gives the ranking for the six subcategorization categories. As one can easily see, the percentages of correct responses for the different categories in the four levels were approximately the same. For the four levels combined, the highest percentage was (91.6) for the Infin-END category. The lowest percentage was (74.45) for the Infin-NP/Gerund category.

Based on the group mean scores for the twenty-five subjects, rankings for each level for the infinitival

Table 5.1. The percentage of correct responses for each category for the four levels of students

Category	Percentage of correct responses				Total[a]
	Level 1	Level 2	Level 3	Level 4	
Infin-NP	86.8	89.3	91	87.4	88.6
Infin-END	90.2	91.3	92	93	91.6
Infin-NP/That	81	78	84	83.8	81.67
Infin-END/That	80.2	81.5	78.6	82.7	80.76
Infin-NP/Gerund	72.4	74	76	76	74.45
Infin-END/Gerund	87.1	91.75	88	90.4	89.32

[a]Percentage of correct responses when the four levels are added and treated as one group.

Table 5.2. The ranking based on the percentage correct for each category

Category	Ranking				Total[a]
	Level 1	Level 2	Level 3	Level 4	
Infin-NP	3	3	2	3	3
Infin-END	1	2	1	1	1
Infin-NP/That	4	5	4	4	4
Infin-END/That	5	4	5	5	5
Infin-NP/Gerund	6	6	6	6	6
Infin-END/Gerund	2	1	3	2	2

[a]Ranking when the four levels are added and treated as one group.

subcategorization categories were made to compare how these rankings changed from level to level. The Spearman Rank Correlation Matrix is given in Table 5.3. It can be seen that the rankings for all the four levels correlated significantly.

Table 5.3. Spearman Rank Coefficients: Rank orderings for infinitival subcategorization categories

	Level 1	Level 2	Level 3	Level 4
Level 1	1.00			
Level 2	.89	1.00		
Level 3	.94	.77	1.00	
Level 4	1.00	.89	.94	1.00

5.2. Correlations in Rankings

In this section, two analyses are made. The first analysis concerns correlation between the group ranking and the individual rankings. The second analysis attempts to determine whether or not the individual rankings are significantly correlated.

Table 5.4 presents the correlation between the group ranking and the individual rankings for the four levels. Out of the twenty-five subjects examined in each level, only three had rankings which were significantly correlated with the group-derived ranking in level one, two in level two, seven in level three, and three in level four. This would seem to indicate that individual rankings are being misrepresented

Table 5.4. Correlation between the group ranking and the individual rankings

Subjects	Level 1	Level 2	Level 3	Level 4
1	.43	.87	.77	.59
2	.72	.37	.66	.67
3	.88*	.57	.89*	.93*
4	.88*	.58	.67	.81
5	.55	.58	.75	.17
6	.71	.64	.98*	.66
7	.60	.72	.75	.94*
8	.32	.94*	.94*	.52
9	.72	.54	.92*	.71
10	-.08	.83	.92*	.08
11	.31	.83	.98*	.08
12	.77	.46	.78	.38
13	.48	.67	.37	.49
14	.93	.29	.66	.81
15	.84	.32	-.03	.54
16	.84	.94*	.54	.06
17	.71	.65	.41	.75
18	-.06	.49	.69	.66
19	.52	.52	.77	.77
20	.77	.77	.89*	.72
21	.88*	.26	.77	.46
22	.26	-.09	.20	.71
23	.88*	.12	.57	.93*
24	.20	.87	0.0	.72
25	.56	.85	.44	.23

*$p < .02$.

by rankings based on group data for the four levels.

In order to determine if the individual rankings are significantly correlated, they were compared with each other. In Appendix C, the Spearman rank correlation coefficient matrices for the four levels are given. The significant correlations have been circled. It was found

that for level one, the rankings correlated only (6.33) percent of the time (i.e., in only nineteen out of three hundred cases were the correlations for the rankings significant). In these cases, the correlation factors were greater than (0.88) with probabilities less than (0.02). For level two, the rankings correlated only (6.67) percent of the time. For level three, the rankings correlated only (7) percent of the time, and for level four, the rankings correlated only (5.67) percent of the time. This is an indication that there is a great deal of variation among the subjects in each level. Such results verify the findings in the Rosansky (1976) and Schwarte (1982) studies.

5.3. Sequential Relationships

In this section, the sequential relationships based upon the ordering-theoretic method developed by Bart and Krus (1973) are represented. Matrices and tree diagrams for each of the four levels are presented. A tolerance level of five percent is allowed for performance errors. All the percentages which are below five percent have been circled. Table 5.5 presents the matrix of disconfirmatory responses for first year students.

It can be seen from the matrix in Table 5.5 that all structures are prerequisites to Infin-NP/Gerund. Infin-NP is a prerequisite to Infin-NP/That and Infin-END/That. Infin-END is a prerequisite to Infin-NP/That and

Table 5.5. Disconfirmatory matrix for first year students

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	20	4	4	0	20
Infin-END	8	--	4	4	0	12
Infin-NP/That	44	56	--	8	0	36
Infin-END/That	48	60	12	--	4	40
Infin-NP/Gerund	56	68	16	16	--	44
Infin-END/Gerund	32	36	8	8	0	--

Infin-END/That. These relationships are presented in a form of a tree diagram in Figure 5.1.

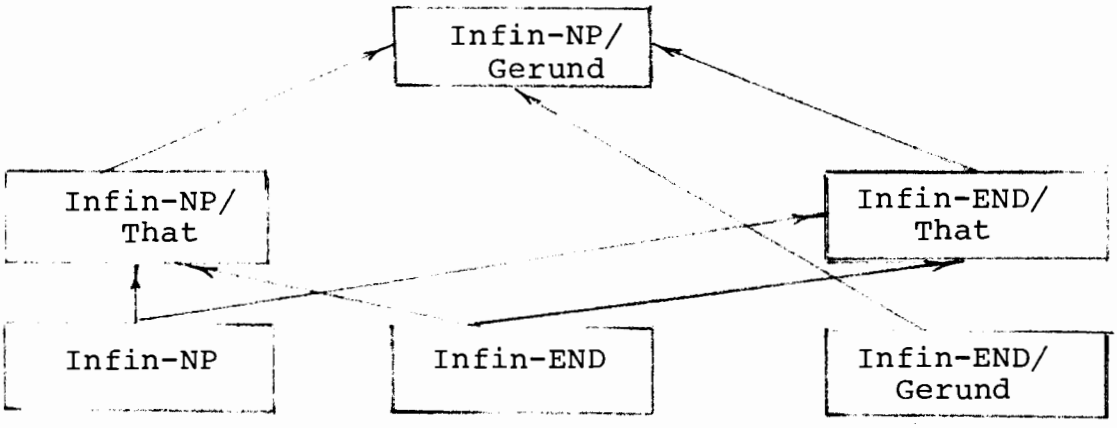


Figure 5.1. Hierarchy of difficulty for subcategorization categories for first year students

It can be seen from Figure 5.1 that there are three structures which are the easiest: Infin-NP, Infin-END and Infin-END/Gerund. Infin-NP/That and Infin-END/That are the next easiest categories, and Infin-NP/Gerund is the hardest. The success with Infin-NP/Gerund comes after the success with the other five structures. The success with Infin-NP and Infin-END is a prerequisite to the success with Infin-NP/That and Infin-END/That. With certain structures, the presence of an NP has an effect on the difficulty of an item. Infin-END/Gerund is one of the easiest categories. On the other hand, the Infin-NP/Gerund category is the most difficult. There is no sequential relationship found between Infin-NP and Infin-END or between Infin-NP/That and Infin-END/That; they seem to be of equal difficulty.

Schwarte (1982) found that with respect to verbs requiring the infinitive form only, those with NPs are more difficult than their END counterparts (i.e., Infin-END structures are prerequisites to Infin-NP structures). This "NP after END" relationship holds also for Infin/That verbs. But Schwarte (1982) found no sequential relationship between Infin-END/Gerund and Infin-NP/Gerund; both environments received perfect scores by all subjects in her study. In the study undertaken here, there is a sequential relationship between Infin-END/Gerund and Infin-NP/Gerund. As mentioned before, Infin-END/Gerund is a prerequisite to

Infin-NP/Gerund.

It can be seen from the matrix in Table 5.6 and Figure 5.2 that for second-year students, like the first-year students, all structures are prerequisites to Infin-NP/Gerund. The sequence of structures and the relationships between them is very similar to what was found for first-year students. A difference between the two groups is that for second-year students it appears that the Infin-END/Gerund structure is also a prerequisite to the Infin-END/That structure, which is not clear in the matrix or the tree diagram for the first-year students. A similar ordering is found for third-year students and for the one hundred students when treated as one group.

Table 5.6. Disconfirmatory matrix for second-year students

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Gerund
Infin-NP	--	20	0	4	0	20
Infin-END	16	--	0	4	0	24
Infin-NP/That	48	52	--	16	4	60
Infin-END/That	48	52	12	--	4	56
Infin-NP/Gerund	60	64	16	20	--	68
Infin-END/Gerund	12	20	4	4	0	--

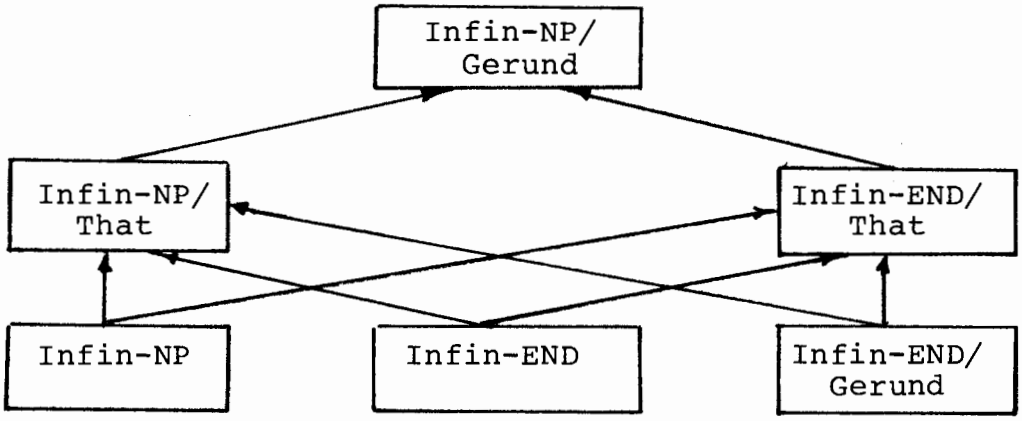


Figure 5.2. Hierarchy of difficulty for second-year students

Table 5.7. Disconfirmatory matrix for third-year students

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	24	12	8	(0)	24
Infin-END	16	--	(4)	(0)	(0)	12
Infin-NP/That	44	44	--	8	(0)	32
Infin-END/That	48	48	16	--	(0)	32
Infin-NP/Gerund	60	68	28	20	--	48
Infin-END/Gerund	36	32	12	(4)	(0)	--

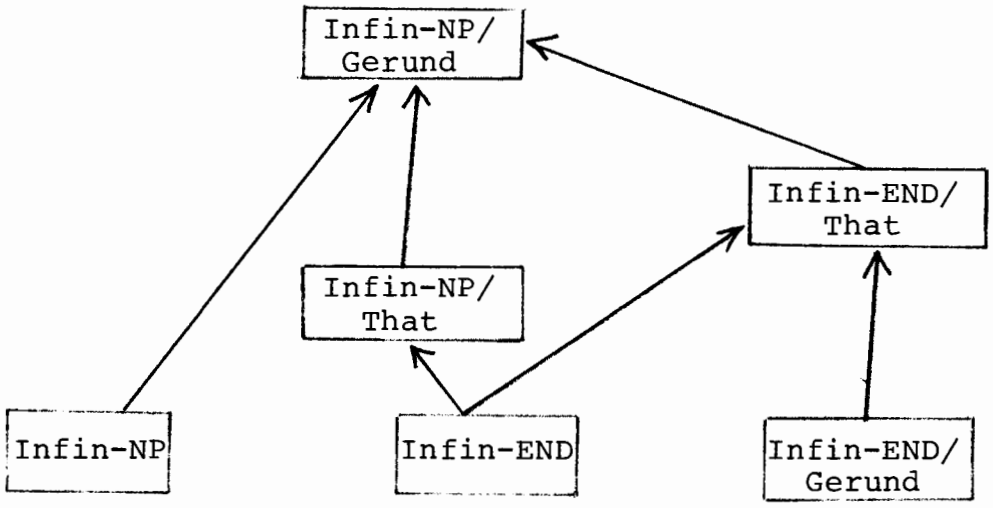


Figure 5.3. Hierarchy of difficulty for third-year students

It can be seen from the matrix in Table 5.7 that for third-year students, like the first and second-year students, all structures are prerequisites to Infin-NP/Gerund. Figure 5.3 shows that there are three structures which are the easiest: Infin-NP, Infin-END, and Infin-END/Gerund. Infin-NP/That is the next easiest category followed by Infin-END/That. The Infin-NP/Gerund is the hardest category. It can be seen from Figure 5.3 that unlike the first- and second-year students, there is no sequential relationship between Infin-NP and Infin-END/That. For the third-year students, like the second-year students, the Infin-END/Gerund is a prerequisite to Infin-END/That. This sequential relationship is not found for the first-year students. For the third-year students, like the first-year students, there

is no sequential relationship found between Infin-END/ Gerund and Infin-NP/That; such a relationship is found for the second-year students.

Looking at Figure 5.4, we will find that there are some similarities and some differences between the hierarchy of difficulty of the fourth-year students and that of the other levels. There is an agreement for all levels that the easiest categories are the Infin-NP, Infin-END, and Infin-END/ Gerund. The difference between the hierarchy of difficulty for the fourth-year students and that of the other levels is that while the Infin-NP/Gerund category is the hardest for the first-, second-, and third-year students, the hardest

Table 5.8. Disconfirmatory matrix for fourth-year students

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	20	16	(4)	8	32
Infin-END	8	--	(4)	(4)	(4)	20
Infin-NP/That	36	36	--	8	8	36
Infin-END/That	36	48	20	--	12	40
Infin-NP/Gerund	52	60	32	24	--	42
Infin-END/Gerund	28	28	12	(4)	(0)	--

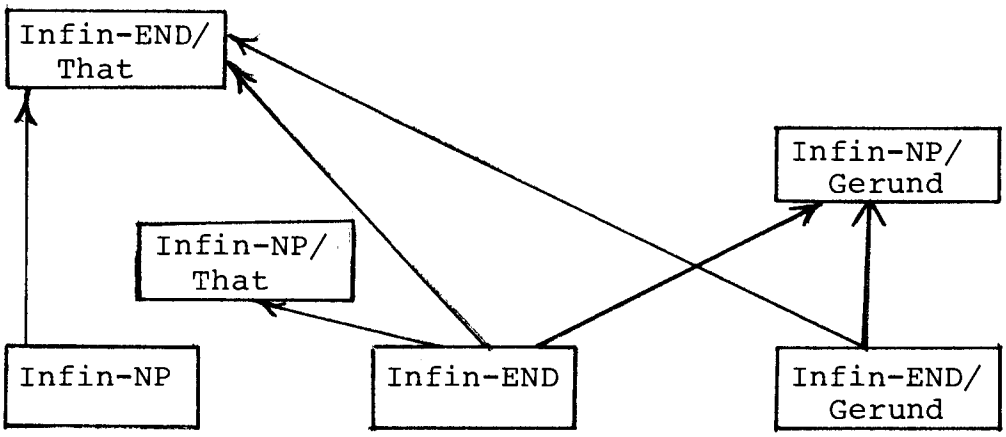


Figure 5.4. Hierarchy of difficulty for fourth-year students

category for the fourth-year students is the Infin-END/That followed by the Infin-NP/Gerund category. For the fourth-year students like the first- and second-year students, the Infin-NP category is a prerequisite to the Infin-END/That category. For all levels, Infin-END is a prerequisite to Infin-NP/That, Infin-END/That and Infin-NP/Gerund. Infin-END/Gerund is a prerequisite to Infin-NP/Gerund for all levels. Infin-END/Gerund is a prerequisite to Infin-END/That for all levels, except for level one.

In sum, it is found that the sequential relationships between categories vary from one level to the other. A reason for this may be because the tolerance level which is allowed by the Bart and Krus method is five percent. This

allows no more than one disconfirmatory response for the twenty-five students in each level; two disconfirmatory responses would yield a percentage above the tolerance level. In the third- and fourth-year student matrices, we find that in many cases, there were two disconfirmatory responses instead of one, but they were not considered disconfirmatory because they yielded a percentage above the tolerance level, i.e., eight percent. That is why the number of prerequisite relationships among categories in levels three and four was less than that for levels one and two.

Table 5.9 and Figure 5.5 illustrate the sequential relationships between categories when all four levels are combined. It can be seen that Infin-NP is a prerequisite to Infin-END/That and Infin-NP/Gerund. Infin-END is a prerequisite to Infin-NP/That, Infin-END/That and Infin-NP/Gerund. Both Infin-NP/That and Infin-END/That are prerequisites to Infin-NP/Gerund which is a prerequisite to Infin-END/That and Infin-NP/Gerund.

5.4. The Influence of the Type of Elicitation Task on the Students' Results

The test used in this study, as mentioned before, consists of two parts: free part and controlled. It was found that there was a big difference between the students' correct responses in the two parts of the test. For most

Table 5.9. Disconfirmatory matrix for all the students (one hundred students)

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	21	8	5	2	24
Infin-END	12	--	3	3	1	17
Infin-NP/That	43	47	--	10	3	41
Infin-END/That	45	52	15	--	5	42
Infin-NP/Gerund	57	65	23	20	--	52
Infin-END/Gerund	27	29	9	5	0	--

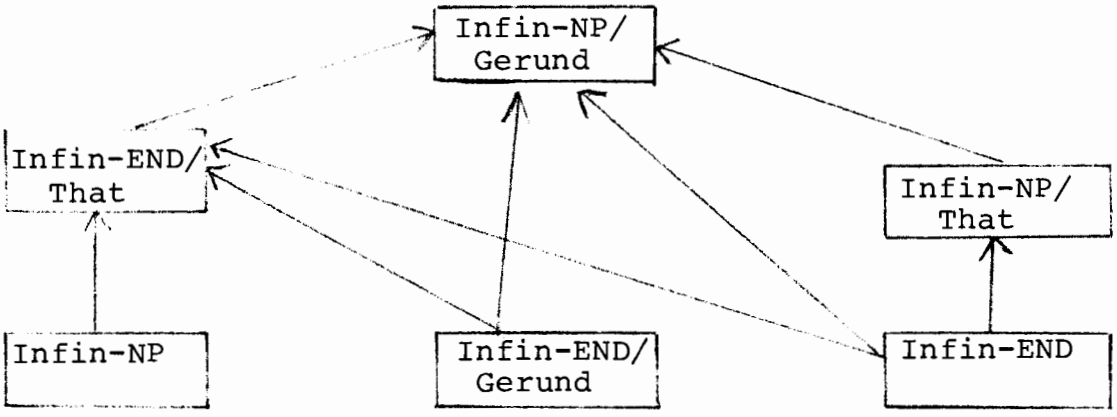


Figure 5.5. Hierarchy of difficulty for all the one hundred students in all levels when treated as one group

categories, the students scored higher in the free part than in the multiple choice part. This seems to confirm Krashen's (1977a) contention that the type of elicitation task influences the results. Table 5.10 presents the percentages of correct responses for some of the first-year students in both parts of the test (for the results of the rest of the students in all levels, see Appendix B).

It was found that many strategies were used by the students in the multiple choice section, which brought their scores down in this section. When they were asked to circle all the correct answers, their ignorance of the subcategorization features for the infinitival verbs within each category, their ignorance of the environment restrictions for verbs like "hope" and "decide", and their use of overgeneralization became very evident. Most of the students circled only the gerund complement with verbs like "hear" and "see" and both the infinitive and the gerund with Infin-Only verbs. Others circled both the Infinitive and the that-complement with the verbs "hope" and "decide" in the NP-environment.

In the free part of the test, the percentage of students' correct responses increased because they were allowed to choose any complement they wanted. What happened was that they did not use the complement that they did not know and used the one whose correctness they were sure of.

Table 5.10. Individual scores (% correct) for some of the first-year students

Subjects	Infin-NP		Infin-END		Infin-END/That		Infin-NP/Gerund	
	Free part	M.C. part	Free part	M.C. part	Free part	M.C. part	Free part	M.C. part
1	100	100	100	80	100	40	100	41.66
2	100	100	100	100	100	60	100	41.66
3	80	100	100	90	100	70	83.33	50
11	60	40	100	50	100	73.33	83.33	37.5
13	40	90	100	50	100	66.66	16.66	16.66
17	100	80	100	80	100	50	83.33	41.66
18	100	70	60	90	100	76.66	100	37.5
19	100	100	100	100	100	90	100	50
23	100	70	100	90	100	63.33	100	50
24	80	80	100	60	100	50	66.66	41.66
25	100	100	100	80	100	80	83.33	50

This may be supported by the fact that with the verb "hear" in the free part of the test, only seven percent of the students used the infinitive, and only four percent of the students used it with the verb "see" (see Table 5.24). In the multiple choice part when the students were asked to circle all the correct answers, most of them circled just the gerund complement for the verbs "hear" and "see". So the students' ignorance of the subcategorization features for these two verbs was the reason behind not circling the infinitive complement in the multiple choice section, and made them use the other optional complement, i.e., the gerund in the free part of the test.

Another interesting observation is that the hierarchy of difficulty between the categories changes depending on the elicitation task. Table 5.11 presents the matrix based upon the results from the free part of the test; Table 5.12 shows the matrix based upon the results from the multiple choice part. The tree diagrams for each part derived from these matrices are presented in Figure 5.6 (free part) and Figure 5.7 (multiple choice part). Table 5.13 and Figure 5.8 present the matrix and tree diagram for the combined results.

If we look at the three disconfirmatory matrices and the three hierarchies of difficulty, we can see that there

Table 5.11. Disconfirmatory matrix of the free part of the test for the one hundred students in all levels

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	38	23	46	29	50
Infin-END	3	--	9	12	14	17
Infin-NP/That	19	41	--	41	22	47
Infin-END/That	5	6	4	--	11	11
Infin-NP/Gerund	16	36	13	39	--	37
Infin-END/Gerund	0	2	1	2	0	--

Table 5.12. Disconfirmatory matrix of the multiple choice part of the test for the one hundred students in all levels

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	10	5	1	0	11
Infin-END	18	--	8	0	0	21
Infin-NP/That	54	49	--	4	0	30
Infin-END/That	66	57	20	--	2	36
Infin-NP/Gerund	72	64	23	9	--	40
Infin-END/Gerund	47	46	14	4	1	--

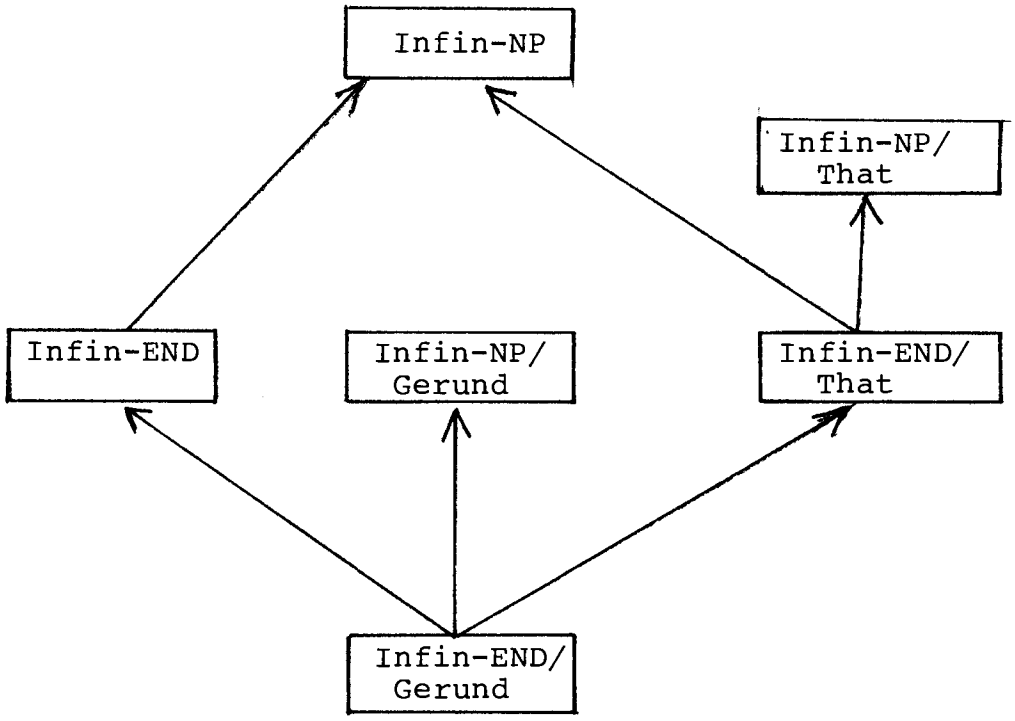


Figure 5.6. The hierarchy of difficulty based upon the disconfirmatory matrix of the free part of the test

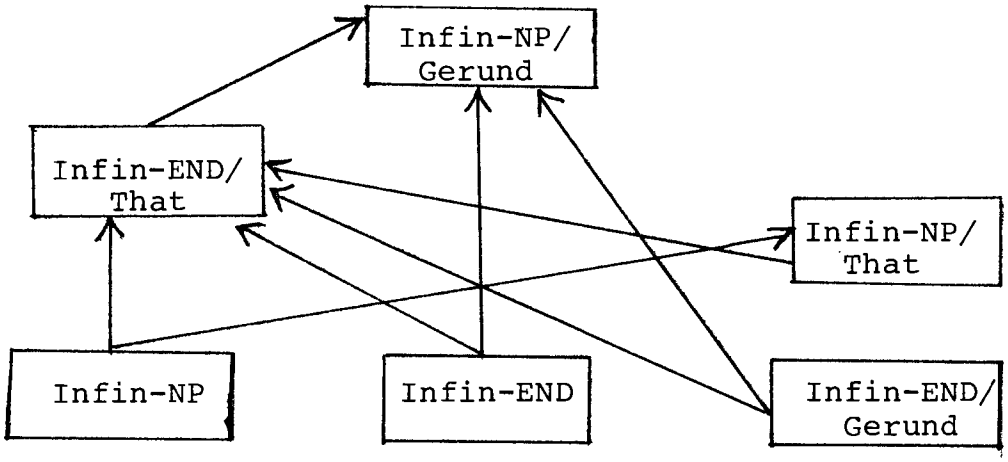


Figure 5.7. The hierarchy of difficulty based upon the disconfirmatory matrix of the multiple choice part

Table 5.13. Disconfirmatory matrix of the whole test after combining the two parts

	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
Infin-NP	--	21	8	5	2	24
Infin-END	12	--	3	3	1	17
Infin-NP/That	43	47	--	10	3	41
Infin-END/That	45	52	15	--	5	42
Infin-NP/Gerund	57	65	23	20	--	52
Infin-END/Gerund	27	29	8	5	0	--

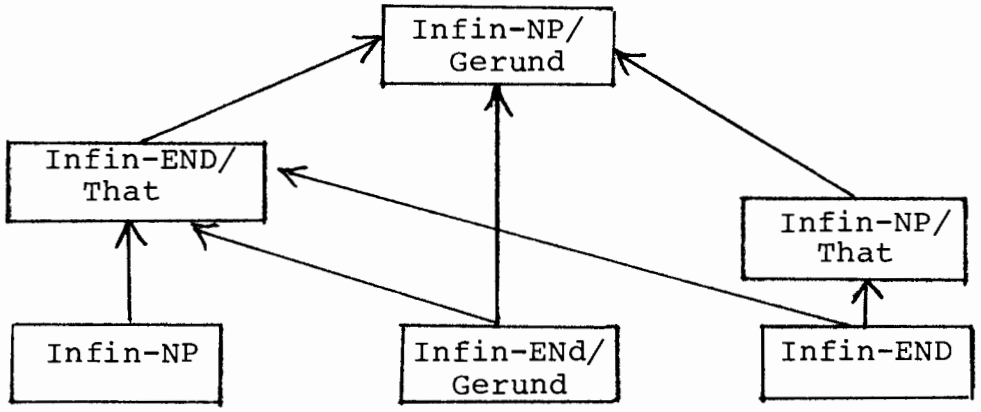


Figure 5.8. The hierarchy of difficulty for the whole test after combining the free part and the multiple choice part

is a difference between those for the free part of the test and those for the multiple choice part. The category Infin-NP was the most difficult category in the free part of the test but the easiest in the multiple choice part. On the other hand, the Infin-NP/Gerund category was the most difficult in the multiple choice part but was fairly easy in the free part of the test. Thus, the sequential relationships between categories in the free part of the test differ from those in the multiple choice part.

There were two items in the free part of the test which many students did poorly on. These two items brought the percentages of the verbs "need" and "decide" in the NP environment down. As a result, the two categories, i.e., the Infin-NP and the Infin-NP/That, were more difficult in the free part than the multiple choice part of the test. This is illustrated in Table 5.14.

Table 5.14. Percentage of correct response for the verbs "need" and "decide"

Verb	Environ-ment	% of correct response in the multiple choice part	% of correct response in the free part
Need	NP	92.5	77.3
Decide	NP	76.83	68.00

The following discussion will deal with each one of these two items separately.

(1) In question II.9, which was a translation item, the verb "need" in the NP environment was used. The stimulus sentence was:

تحتاج فاطمه أن يشتري لها علي بعض الأشياء.

"Fatma needs Ali to buy her a few things."

One possible reason behind the high percentage of errors for this question is that the students misread the word "علي", which is a name of a person, as "على", which is a preposition meaning "on", because these two words have the same spelling in Arabic. Nearly forty-four percent of the students in all levels got this question wrong. It is possible that if there was another name in the stimulus sentence, e.g., Mohammed instead of Ali, the percentage of incorrect responses would not be so high, and the Infin-NP category would not be the most difficult category in the free part of the test. Table 5.15 shows the number of students making each type of possible response for question II.9.

(2) The other difficult item was question III.3, which involved the combining of two sentences using the verb "decide" in the NP environment. The stimulus sentence was:

"My father decided it. I have to buy a new car."

"My father decided that I have to buy a new car."

Table 5.15. Number of students making each type of possible response in question II.9

Number of students responding correctly	Number of students changing the sentence into passive	Number of students changing the meaning	Number of students using the wrong complement	Number of students giving no response
56	19	17	5	3

From analyzing the students' errors, it was clear that the students changed the meaning of the sentence to be able to use the infinitival complement instead of the that-complement. As will be shown in section 5.6, the students prefer the infinitival complement over the clausal one. Since the verb "decide" in the NP environment has an environment restriction, i.e., it cannot take the infinitive, many students changed the environment in order to be able to use the infinitive. A sample of meaning changes include:

"My father decided to buy a new car."

"My father decided to buy me a new car."

"My father decided to let me buy a new car."

Thus, it seems that one of the strategies that second language learners use is changing the meaning to be able to use the easy structure. Table 5.16 shows the number of students making each type of possible response. From Table 5.16,

it is evident that many students changed the meaning of the sentence and the category of the verb "decide" to be able to use the infinitive.

Table 5.16. Number of students making each type of possible response in question III.3

Number of students responding correctly	Number of students changing the meaning and the category	Number of students using the wrong complement
68	26	6

5.5. Environments

In this section, the effect of the environment (NP or END) on the difficulty of each category will be discussed. For this analysis, only the results of the multiple choice section will be used. This is because the students' responses in the free part of the test do not indicate whether the students know or do not know that some verbs can take the infinitive plus another complement. In the free part of the test, they may not use one of the two complements for two possible reasons: (1) they are not sure about it, so they use the one they are sure about; (2) they do not know that it can be used. Schachter (1974) has also found evidence of avoidance in her study.

In the multiple choice section, the students cannot use the avoidance strategy. They are asked to circle all of the correct complements which are possible. Through the graduated coding of the multiple choice section (see the description of the testing procedure in Chapter 4), it is easy to see whether students know the subcategorization features for the verbs within each category, e.g., do students know that "expect" can take both the infinitive and the that-complement, while "hear" can take the infinitive and the gerund.

Since the avoidance strategy may not play any role with verbs which can take only the infinitival complement, it is possible to combine the results of both parts of the test and determine the difficulty of each verb, each category and each environment. It is felt that with the Infin-That category and the Infin/Gerund category, the results of the multiple choice section are more revealing because the students cannot use the avoidance strategy.

5.5.1. Verbs which can take only the Infinitive

The question here is: will verbs which can take the infinitive in both the NP and END environments, i.e., "need" and "want", be easier than verbs which have an environment restriction and can take the infinitive only in the NP environments, i.e., "order"? It is interesting

to know also if verbs that can take the infinitive in both the NP and END environments are easier in one environment than the other.

Table 5.17 represents the percentages of correct response for each verb in each environment and in each part of the test (i.e., the free part and the multiple choice part).

Table 5.17. Percentage of correct response for Infin-Only verbs

Category	Verbs	Multiple choice part	Free part	The two parts of the test combined
Infin-NP	Want	91.22	100	95.61
	Need	92.5	77.33	84.9
	Order	87	98	92.46
Infin-END	Want	90	94.65	92.33
	Need	85.5	92.5	89

Table 5.17 shows that in the multiple choice part, the verb "need" in the NP environment is easier than the END environment. For the verb "want", the percentages of correct response in the NP and END environments are

similar. The verb "order" which can take the infinitive only in the NP environment is more difficult than the verbs "want" and "need" which can take the infinitive in both the NP and END environments.

Moreover, the percentage of correct responses for each verb varies according to not only environment but also the type of task: while the verb "order" in the NP environment was the most difficult verb in the multiple choice part, it was not so in the free part or when both parts were combined. On the other hand, what happened with the verb "need" was the opposite: the percentage of correct responses in the multiple choice part was higher than that for the free part. In sum, it seems that all three factors--the verb itself, the type of task, and the environment (NP or END)--influence the results.

5.5.2. Verbs which can take Infinitive/That

Two questions are answered in this part. The first question is whether verbs which can take either the infinitive or the that-clause in both NP and END environments, i.e., "expect" and "promise", are easier than verbs which can take the infinitive only in the END environment, i.e., "decide" and "hope". The second question is whether one environment (NP or END) is easier or more difficult than the other for the same verb which can come in both environments. Table 5.18 presents the percentages of correct responses for

Table 5.18. Percentage of correct response for Infin/That verbs

Category	Verbs	Multiple choice part	Free part	The two parts of the test combined
Infin-NP/That	expect	--	99	99
	promise	74.17	100	87.08
	decide[a]	76.83	68	72.17
	hope[a]	80.5	72.5	76.5
	tell	73.83	--	73.83
Infin-END/That	expect	65.67	92.5	79.08
	promise	--	97	97
	decide	64.33	--	64.33
	hope	65	98	81.5
	plan	63.5	99	81.25

[a]Although the verbs "decide" and "hope" can take just the that-complement and not the infinitive with an NP, these verbs are included in this category to see whether or not the students are aware of this environment restriction.

each verb in both environments and in both the multiple choice and the free part of the test separately and combined.

Looking at the multiple choice results for the Infin-NP/That category, we find that the environment restriction for the verbs "decide" and "hope"--they cannot take the infinitive in the NP environment--did not make these verbs more difficult than other verbs like "promise" and "tell" which have no such restriction. "Decide" and "hope" in the

NP environment in the multiple choice part were at the same level of difficulty or slightly easier than "promise" and "tell". When it comes to the END environment, we can see that although the verbs "decide" and "hope" have no environment restriction in the END environment, their percentages of correct responses were lower than in the NP environment in the multiple choice part. The verb "decide" scored (76.83) in the NP environment and (64.33) in the END environment. The verb "hope" scored (80.5) in the NP environment and (65) in the END environment. "Hope" in the END environment in the free part scored a higher percentage (98) than in the NP environment in the same part of the test (72.5). Table 5.18 also shows that verbs which can take the infinitive and the that-complement in only the NP environment, i.e., "tell", were easier than verbs which can take the infinitive and the that-complement in the END environment, i.e., "plan".

In sum, most of the verbs scored very high in the free part of the test; the reason was that given the opportunity, the students avoided using complements which they did not control. In the multiple choice part, they did not have this opportunity because they had to circle all possible correct complements and here they were in trouble and made mistakes. In general, looking at the multiple choice part, the percentages of correct responses for the

NP environment were higher than the END environment. This suggests that the NP environment, in spite of the restrictions of some verbs, was easier than the END environment.

5.5.3. Verbs which take Infinitive/Gerund

The question which may be asked here is: are verbs which take the infinitive and the gerund complements in the NP environment easier or more difficult than verbs which take the same complements in the END environment? Table 5.19 gives the percentages of correct responses for each verb. As can be seen from the multiple choice part of the test, the verbs which can take the infinitive and the gerund

Table 5.19. Percentage of correct response for Infin/Gerund verbs

Category	Verbs	Multiple choice part	Free part	The two parts of the test combined
Infin-NP/ Gerund	hear	46	94	70.25
	see	55.83	88	71.92
Infin-END/ Gerund	begin	81.67	99	90.83
	start	72.84	100	88.293
	try	70.17	100	84.96
	like	88.17	99	91.334

in the NP environment, i.e., "hear" and "see", were more difficult than verbs which take the infinitive and the gerund in the END environment, i.e., "begin", "start", "try", and "like".

The students were expected to have fewer errors in the free part of the test than the multiple choice part in both (NP and END) environments. This is due to the fact that in the free part of the test, the students could choose any complement they want. It was found that for both environments, the students' scores were higher in the free part than the multiple choice part. However, the NP and END environments were not of equal difficulty neither in the multiple choice part, nor in the free part where the students could choose any complement they want. In the two parts of the test, the NP environment was more difficult than the END environment. An interesting observation in Table 5.19 is that while the percentage of correct response for the verb "see" is higher than "hear" in the multiple choice question, it is lower in the free part of the test. In the END environment, we find that in the multiple choice section the verb "like" was the easiest, followed by the verb "begin", and the hardest verbs were "start" and "try". In the free part of the test, the four verbs were very easy and scored very high percentages. So, one can say that with verbs which can take the infinitive and the gerund, three factors--the environment, the specific

verbs, and the type of elicitation task--influenced the percentages of correct responses.

Table 5.20 summarizes and shows the difference in difficulty for the three categories of verbs which can take the infinitive based on the multiple choice question where the students cannot use the avoidance strategy for verbs that allow two complements. It is clear that students know the

Table 5.20. Percentage of correct response for each category in the multiple choice part

	Infin-Only	Infin/That	Infin/Gerund
Percentages of correct responses	89	70.5	64.56

subcategorization features for the verbs within category Infin-Only better than for verbs in the other two categories. The most difficult category was the Infin/Gerund, and the Infin/That category lies between the two. A breakdown of the above categories according to environments will show which environment in each category is easier, based also on the multiple choice part of the test. This is presented in Table 5.21.

As can be seen from Table 5.21, the NP environment for the Infin/That category was easier than the END environment, whereas for the Infin/Gerund category, the END environment was much easier than the NP environment. For the Infin-Only

Table 5.21. Percentage of correct response in NP and END environments for each category in the multiple choice part

Category	NP	END
Infin-Only	90.24	87.75
Infin/That	76.33	64.62
Infin/Gerund	50.91	78.21

category, both environments, i.e., NP and END, were very close to each other.

5.6. Complement Preference

Findings will be presented in this section for complement choice: given instances where two types of complements are possible with a verb, will one complement be preferred over the other? To answer this question, the analysis of the free part of the test was used because the students were free to choose any possible complement that they preferred. The multiple choice question could not be used in this section because the students had to circle all possible correct complements. Table 5.22 presents percentages of responses selecting different complements with the Infinitival/Clausal-complement verbs. Table 5.22 shows that the infinitival

Table 5.22. Infinitival/Clausal-complement verbs (percentage of responses selecting different complements) in the free part

Infinitival	Clausal	Both Infinitival and Clausal	Errors
75.4	21.6	0.6	2.4

complement was preferred over the that-clause. Of those who chose the that-clause in the free part of the test, there were seven percent who did not circle the infinitive with the Infinitival/Clausal-complement verbs in the multiple choice question, i.e., they did not choose the infinitive out of ignorance. The other students who preferred the that-clause in the free part of the test knew that the Infinitival/Clausal-complement verbs can take two complements, i.e., they circled both the infinitive and the that-clause in the multiple choice part of the test. Thus, it seems to be the case that selection of a complement was due to preference and not ignorance. Table 5.22 also shows that there were some students who did not show a preference, i.e., they gave two possible answers for a stimulus sentence using the two possible complements, the infinitival and the clausal.

With Infinitival/Clausal-complement verbs, a breakdown according to environment revealed that the infinitive was still preferred over the that-clause in both environments. But the preference of the infinitive in the END environment, as can be seen in Table 5.23, greatly exceeds that of the NP environment.

Schwarte (1982) also found that although the infinitival complement is favored in both environments, its preference with END environments was substantially higher than

Table 5.23. Infinitival/Clausal-complement verbs (environment influence percentages of responses)

Environment	Infinitival	Clausal	Both Infinitival and Clausal	Errors
NP	59.0	41.0	0.0	0.0
END	86.33	8.67	1.0	4.0

with NP environments. Especially noticeable was the influence of the environment on the verb "promise". Table 5.24 presents what was found in this study regarding the influence of the environment on the complement preference for the verbs "expect" and "promise" and they will be compared to what Schwarte (1982) found regarding the verb "promise". As can be seen in Table 5.24, the infinitival complement was not preferred with the verb "expect" in the NP environment, and this is similar to what Schwarte found regarding the verb "promise". The that-complement was preferred over the infinitive with both verbs. The explanation for this preference will be discussed in the transference part.

When it comes to the Infinitival/Gerundive complement verbs, we find that the gerundive complement was preferred, as illustrated in Table 5.25. There were some students, as can be seen in Table 5.25, who did not show a preference (i.e., they gave two possible answers for a stimulus sentence

Table 5.24. The influence of environment on verbs regarding the complement preference

Verb		Complement choice			
		Infinitival	Clausal	Both Infinitival and Clausal	Errors
Promise (the present study)	Environments combined	81.5	15	1.5	2.0
	For each environment				
	NP	77	23	0.0	0.0
	END	86	7	3.0	4
Expect (the present study)	Environments combined	65.5	31.5	0.0	3
	For each environment				
	NP	41	59	0.0	0.0
	END	90	4	0.0	6
Promise (Schwarte, 1982)	Environments combined	Infinitival 61.6	Clausal 32.6	No response 5.8	Errors 0.0
	For each environment				
	NP	27.9	60.5	11.6	0.0
	END	95.3	4.7	0.0	0.0

Table 5.25. Infinitival/Gerundive-complement verbs complement preference, percentages of responses

Infinitival	Gerundive	Both Infinitival and Gerundive	Errors
30.50	58.33	7.67	3.50

using the two possible complements, the infinitival and the gerundive).

With Infinitival/Gerundive-complement verbs, a breakdown according to environment revealed that in the NP environment, the gerundive complement was preferred, but in the END environment, the choice of complement-type was random; this is illustrated in Table 5.26. There were many students who chose the gerund with the Infinitival/Gerundive-complement verbs in the NP environment because they did not know that those verbs can take the infinitive, i.e., they did not circle the infinitive with those verbs in the multiple choice question. So, it appears that they did not choose the infinitive in the free part of the test out of ignorance.

Table 5.26. Infinitival/Gerundive-complement verbs (environment influence percentages of responses

Environment	Infinitival	Gerundive	Both Infinitival and Gerundive	Errors
NP	5.0	84.5	0.0	10.0
END	43.0	45.25	11.50	0.25

From a breakdown of the Infinitival/Gerundive-complement verbs into the individual verbs, as presented in

Table 5.27, it can be seen that for "begin", the choice of complement type was random. For "hear", "see", "start", and "like", the gerundive complement is preferred over the infinitival complement. The infinitival complement was preferred only with the verb "try".

Table 5.27. Infinitival/Gerundive-complement verbs complement preference, percentages of responses for each verb

Verb	Environment	Infinitival	Gerundive	Both Infinitival and Gerundive	Errors
Hear	NP	7	87	0	6
See	NP	4	82	0	14
Begin	END	44	40	16	0
Start	END	12	61	27	0
Try	END	97	3	0	0
Like	END	19	77	3	1

In summary, it is interesting to note that it seems that there is a universal preference for the infinitival complement for the Infinitive/That category with exceptions for some verbs which differ from one language group to the other. Anderson (1976) found that Spanish speakers preferred the infinitive regardless of whether the stimulus sentence contained an infinitive or a Que-complement.

In both this study and the Schwarte (1982) study, it was found that for Infinitival/Clausal-complement verbs, the infinitival complement was preferred over the that-complement in both NP and END environments. However, there is agreement in both studies that the percentage of using the infinitival complement in the END environment was higher than that for the NP environment.

When it comes to the Infinitival/Gerundive category, it was clear that the preferences were overwhelmingly for the gerund, especially in the NP environment. There is no agreement between this study and the Schwarte study concerning this preference. Schwarte found that the infinitive was favored over the gerund. The explanation for this preference will be discussed in the transference part.

In the first part of this section, an analysis was made to see if the environment had an effect on the complement chosen when two complements are permissible. In this part, we will look at the errors made by the students to see if they overgeneralize a certain complement. In the test we have included as distractors verbs which take only the infinitive, verbs which take only the that-complement and verbs which take only the gerund. Anderson (1976) and Schwarte (1982) found a tendency for students to overgeneralize the infinitive. It will be very interesting to see if this happens with the Arab students as well. Table 5.28

Table 5.28. Complement-selection errors (percentages of responses)

	Level	% Errors	Gerundive	Clausal	Other errors
Infinitive-complement only verbs	1	10.90	5.24	1.63	4.03
	2	8.98	5.55	0.69	2.74
	3	7.35	2.91	0.26	4.18
	4	8.47	4.20	0.54	3.73
	Mean	8.93	4.48	0.78	3.67
	Level	% Errors	Infinitival	Gerundive	Other errors
Clausal-complement only verbs	1	7.67	4.88	2.79	--
	2	7.66	5.00	1.33	1.33
	3	8.83	2.83	4.00	2.00
	4	7.00	2.67	3.66	0.67
	Mean	7.79	3.85	2.94	1.00
	Level	% Errors	Infinitival	Clausal	Other errors
Gerundive-complement only verbs	1	7.67	5.34	0.33	2.00
	2	5.33	4.33	0.33	0.67
	3	4.00	4.00	--	--
	4	9.33	7.67	0.33	1.33
	Mean	6.58	5.34	0.24	1.00

presents the percentages of errors for the three categories that allow only one complement, i.e., Infinitival-complement only verbs; Clausal-complement only verbs and Gerundive-complement only verbs. The percentage of errors for students in each level is presented separately. This was done in order to see if there is a decrease in errors when the number of years of English study increases. Also, this will help to see if all four levels overgeneralize a certain complement or if overgeneralization varies from one level to the other. The mean of the students' errors for the four levels is also given and the following discussion will be based upon it.

As can be seen from Table 5.28, with the Infinitival-complement only verbs, the students overgeneralized the gerund and not the clausal complement. For the Clausal-complement only verbs, the use of the infinitival and the gerundive complements was random. When it comes to the Gerundive-complement only verbs, the overgeneralization of the infinitive was very evident. So, the clausal complement was the one which was overgeneralized the least. This may support the finding mentioned before that the infinitive with the Infinitival/Clausal-Complement verbs was preferred over the clausal complement. In instances where the verbs allowed only the infinitival complement, the gerundive complement was overgeneralized

and this may account for the preference of the gerund complement over the infinitive with the Infinitival/Gerundive-complement verbs. Another possible reason for the preference of the gerund over the infinitive may be that in Arabic we do have an equivalent to the gerund complement, but we do not have one for the infinitival complement.

As mentioned before, the two Infin/That verbs "hope" and "decide" in the NP environment have an environment restriction: they cannot take the infinitive complement, only the clausal complement. Looking at Table 5.29, we find that most of the students' errors were a result of over-generalizing the infinitive with the verbs "decide" and "hope" in the NP environment.

Table 5.29. Percentage of error for "decide" and "hope" in the NP environment

	% of errors	Infinitival	Gerundive	Other errors
Decide	27.6	25.4	2.2	0.0
Hope	23.75	23.0	0.58	0.17

5.7. The Relationship Between English Proficiency and Years of English Study

On the first page of the test, the students were asked to give some information about themselves, e.g., name, age

educational level, number of years of English study, and if they had studied English outside of Saudi Arabia (see the first page of the test in Appendix A).

As illustrated in Table 5.30, in each of the four levels included in this study, there were some students who had studied English for a few years in the U.S.A. or England, the average number of years being three years. There were other students who had started learning English in an elementary school in an Arabic-speaking country. The rest of the students had started learning English in the intermediate schools, i.e., they had studied it for six years, four hours a week, before joining the university.

As can be seen from Table 5.30, the students who had started learning English in an elementary school performed better than those who did not. But the difference in the percentages was not very significant. Moreover, the students in the fourth level as a whole did not perform better than those in the other levels; they scored only two percent higher than the first level and less than one percent higher than the second and the third levels. So, it seems that the number of years of English study does not cause a better acquisition of the subcategorization features of the infinitival verbs. This finding is similar to

Table 5.30. The relationship between language acquisition environment and test scores

	Students who studied in U.S.A. or England		Students who started learning English in elementary school		Rest of the students		Mean score for the 25 students in each level
	Number of students	Mean score	Number of students	Mean score	Number of students	Mean score	
First level	5	87.71	11	82.66	9	80.66	82.95
Second level	9	85.88	8	85.59	8	81.29	84.32
Third level	5	89.20	6	86.24	14	82.78	84.89
Fourth level	2	92.61	8	86.00	15	84.20	85.47
Mean score for the four levels		88.85		85.12		82.23	

what Saegert et al. (1974) found in their study, that proficiency cannot be assessed purely on the basis of the number of years of EFL training.

In addition to information about the number of years of language study, the questionnaire also elicited information about language instruction abroad. Table 5.30 shows that the mean score for those students who had studied in U.S.A. or England for a few years was higher than the other students. But the difference in the percentages was not very significant.

It may be relevant to note in this section that the number of years of English study may result in a decrease of some other types of errors, e.g., the use of the past participle instead of the infinitive after to. While Scott and Tucker (1974) found this type of error to be common among the Arab students in their study, this was not the case in the study undertaken here. Out of one hundred students tested in this study, only six students made this type of error in one out of nineteen questions in the multiple choice part. The difference between the two studies may be due to the fact that their subjects were in a low intermediate intensive English course while the subjects in the present study were advanced. So, using the past participle instead of the infinitive after to may be a common error for beginners and intermediate Arab subjects, but not for the advanced subjects.

5.8. Transference

From examining the students' errors, we can see that there was much evidence of negative transfer. Many students used the gerund with verbs like "want", "need" and "order" which allow just the infinitive in English. In Arabic, those verbs allow two types of complements: the gerund and another type of complement which is equivalent to the that-complement, but the gerund complement is more eloquent than the that-complement. For example,

(1) يريد محمد أن يزور عمه "Mohammed wants that he visits his uncle."

(2) يريد محمد زيارة عمه "Mohammed wants visiting his uncle."

So, the overgeneralization of the gerund with verbs like "want", "need" and "order" was a result of mother tongue interference and this is an example of negative transfer. Table 5.31 presents the percentages of errors with those verbs and, as can be seen, most of the errors were the result of overgeneralizing the gerund with those verbs. Nearly 50 percent of the errors which were made with the infinitive-only verbs were the result of overgeneralizing the gerund; this supports the prediction of contrastive analysis (see page 30). Table 5.32 shows the percentage of errors for each verb in the infinitive-only category. The highest percentage of errors was for the verb "need" (12.98),

Table 5.31. Infinitive-only verbs (percentage of errors)

% of errors	Gerund	That-complement	No/other response
8.88	4.18	0.64	4.06

followed by the verb "order" (7.54). The lowest percentage of errors was (5.485) for the verb "want". So, it seems that the percentage of errors depends on the individual verb.

Table 5.32. Percentage of errors for individual verbs in Infinitive-only category

Verbs	% of errors	Gerund	That-complement	No/other response
Want	5.485	3.8	0.94	0.745
Need	12.98	6.06	0.985	5.89
Order	7.54	2.67	--	4.87

Another finding which may be explained by mother tongue interference is the preference of the gerund over the infinitive with verbs which allow both the infinitive and the gerund in English. With the verbs "hear" and "see" we use the gerund complement in Arabic. For example,

(3) سمعت الولد يغني "I heard the boy singing."

(4) رأيت الشجره تسقط "I saw the tree fall."

In Arabic, we translate both "singing" and "fall" using the circumstantial complement, which is one type of the gerund

in Arabic.

When it comes to the preference of the clausal complement with the verb "expect", mother tongue interference again seems to play a role. Whereas in English it can take either an infinitive or clausal complement, we find that in Arabic the verb "expect" allows either the clausal or gerundive complement:

1. That-complement:

   توقع محمد أن ينتهى على من عمله فى الساعه الرابعه.

   "Mohammed expected <u>that Ali would finish</u> his work at 4:00 o'clock."

2. Gerundive-complement (which we call in Arabic the nominalized form of the verb):

   توقع محمد انتهاء على من عمله فى الساعه الرابعه .

   "Mohammed expected Ali <u>finishing</u> his work at 4:00 o'clock."

Since the stimulus sentence for the verb "expect" in the NP environment (in the translation from Arabic to English, question II.15) used the <u>that</u>-complement, fifty-nine percent of the students used the <u>that</u>-complement and forty-one percent of the students used the infinitival-complement. It seems that the students used the <u>that</u>-complement more because of either the native language or the stimulus sentence.

In summary, although there was a preference for the infinitive in the Infin/That category, the gerund was preferred over the infinitive in the Infin/Gerund category. The

preference of the gerund over the infinitive can be explained by native language transfer. While the contrastive analysis (see section 3.2) could predict that students would use the gerund with verbs like "want", "need", "order", "hear" and "see", it predicted wrongly that the students would prefer the that-complement with verbs like "promise", "plan", "tell" and all verbs which allow the infinitive plus the that-complement: they used the infinitive instead. The reason for predicting the preference of the that-complement over the infinitive was: since Arabic does not have the infinitive, in the English sense, and it has the that-complement, the students are more likely to use the that-complement. When it comes to the preference of the that-complement with the verb "expect" in the NP environment, the explanation which was given was that the stimulus sentence contained the that-complement and in the translation part, the students are more likely to use the same complement as in the stimulus sentence. Since the preference of the infinitive over the that-complement with the category Infinitive/That cannot be explained by the contrastive analysis, an alternative explanation is needed. One explanation is found in Anderson's (1976) study. Anderson explained this phenomenon by relating it to the economy strategy, i.e., the infinitive is a short complement and it is easy for students to learn and produce. So it seems that there is a universal

preference for the infinitive no matter what the native language is. This overgeneralization of the infinitive has also been found with verbs which take only the that-complement or only the gerund. It accounts for most errors as could be seen in Table 5.28.

6. DISCUSSION AND CONCLUSION

The questions under investigation in this study were:

(1) Is there an invariant hierarchy of difficulty for the acquisition of English infinitival sentential complementation by adult speakers of Arabic?

(2) If invariant, how does the invariant ordering for the adult Arabic speakers compare with other language groups learning English infinitival sentential complementation?

(3) What effect does the environment (NP or END) have on the difficulty of each category?

(4) With those verbs which can take the infinitive plus one other complement, is one complement preferred over the other?

(5) Is there a decrease in complement selection errors as the years of English language study increase?

(6) What role does transfer play, either in the selection of a correct complement or in preference?

(7) Do the rankings of difficulty vary from one individual to the other?

In this section, the answers to these questions will be discussed based upon the data obtained in the study.

6.1. Is There an Invariant Hierarchy of Difficulty for the Acquisition of English Infinitival Sentential Complementation by Adult Speakers of Arabic?

Using Bart and Krus's theoretical ordering method, it was found that there was an invariant hierarchy of difficulty for the acquisition of English infinitival sentential complementation by adult speakers of Arabic. The most difficult subcategorization category was Infin-NP/Gerund followed by Infin-END/That and then Infin-NP/That. The easiest subcategorization categories were Infin-NP, Infin-END and Infin-END/Gerund.

In the free part of the test, the students produced fewer complement errors. With those categories which allow two complements, it is most likely that the students were avoiding the use of the complement about whose correctness they were not sure. This would account for the extremely small number of errors for many verbs in the free part. In the multiple choice part, the errors increased because the students were asked to circle all possible correct complements that each verb allows. Here the students could not use the avoidance strategy, and the percentage of errors increased.

Based on the multiple choice section, it was found that the Infin/Gerund category was the most difficult, followed by the Infin/That category. The easiest category was the

Infin-only category. The verbs in the NP environment in the Infin/Gerund category had the lowest percentages of correct responses. It is clear that most of the students in all levels do not know that the verbs "hear" and "see" can take the infinitive complement with to-deletion. It is possible that the reason for not acquiring the infinitival complement for these two verbs is due to the complexity of the syntactic category of to-deletion with those verbs. So, the students seem to simplify the task by first associating just one complement, i.e., the gerundive complement, with the verbs "hear" and "see"; later, they add the second aspect (a second complement), i.e., the infinitival complement with to-deletion. This might indicate a simplification strategy for the learners. This simplification strategy was also used with the verbs "decide" and "hope" in the NP environment. It seems that for the simplification task, the students associate the infinitive and the clausal complements for these verbs indiscriminately. Later, through the refinements of rules, they learn that there is an environment restriction with "hope" and "decide" in the NP environment, i.e., they can take only the clausal complement in the NP environment but can take both the clausal and the infinitival complement in the END environment.

6.2. If Invariant, How Does the Invariant Ordering for the Adult Arabic Speakers Compare with Other Language Groups Learning English Infinitival Complementation?

In comparing the orderings of the six categories included in this study with those of Schwarte (1982), it was found that there were some instances of agreement and some of no agreement. In both studies, Infin-END and Infin-END/Gerund categories were the easiest, and Infin-END/That category was more difficult. The no agreement instances were: while it was found in this study that the Infin-NP/Gerund was the hardest and all complements were prerequisite to it, in Schwarte's study the Infin-NP/Gerund category was one of the easiest categories. The Infin-NP category in the present study was one of the easiest categories; it was not that easy in Schwarte's study. While Infin-NP/That was not the hardest in the present study, it was the hardest category in Schwarte's (1982) study. When it comes to the prerequisite relationships between categories, the agreement, no-agreement, and disagreement instances were as follow:

	The Present Study	Schwarte's Study
1.	Infin-END is a prerequisite to:	
	Infin-NP/That	Agreement
	Infin-NP/Gerund	No agreement[1]
	Infin-End/That	Agreement
2.	Infin-END/Gerund is a prerequisite to:	
	Infin-NP/Gerund	No agreement
	Infin-END/That	Agreement

[1]Schwarte found no prerequisite relationship.

	The Present Study	Schwarte's Study
3.	Infin-NP is a prerequisite to:	
	Infin-END/That	No agreement
	Infin-NP/Gerund	Disagreement[2]
4.	Infin-NP/That is a prerequisite to:	
	Infin-NP/Gerund	Disagreement
5.	Infin-END/That is a prerequisite to:	
	Infin-NP/Gerund	Disagreement

In the present study, it was found that all categories were prerequisite to Infin-NP/Gerund. In Schwarte's study (1982), she found that all categories were prerequisite to Infin-NP/That category.

In trying to account for the instances of no agreement and disagreement, a possible explanation might be that in Schwarte's (1982) study there were not ten questions for each category. Some categories had only two or three questions. Only one infinitival category, Infin-NP/That, had seven questions. In the present study, there were ten questions in each category, and this may be the reason behind the disagreements in the two studies. Krashen (1977a) noted that there must be at least ten obligatory occasions of a morpheme to determine the natural order for grammatical morphemes. He said that the reason for his and Rosansky's (1976) different conclusions was that Rosansky allowed items

[2]Schwarte found the opposite prerequisite relationship.

to be analyzed that appeared in less than ten obligatory occasions. Another factor contributing to these differences between the present study and Schwarte's study may be related to the type of questions used in each study, especially the different tasks in the multiple choice question, i.e., marking all possible correct complements that a verb allows versus marking one correct answer. It was found in the present study that there was a difference between the free part of the test and the multiple choice part concerning the hierarchy of difficulty and the sequential relationships among categories. This is verified by Krashen (1977a), who contends that the type of elicitation task influences the results.

6.3. What Effect Does the Environment (NP or END) Have on the Difficulty of Each Category?

The analysis of the multiple choice section where the students cannot avoid using a certain complement revealed that with Infin-only and Infin/That categories, the NP environment was easier than the END environment. With the Infin/Gerund category, the END environment was easier than the NP environment. One may take into consideration that the verbs and the type of the task were also two important factors in determining which environment and which category was more difficult.

6.4. With Those Verbs Which Can Take the Infinitive Plus One Other Complement, Is One Complement Preferred Over the Other?

From the analysis of the free part of the test, it was clear that the infinitival complement was preferred over the clausal complement for the Infin/That category. This seems to be a universal phenomenon because both Anderson (1976) and Schwarte (1982) also found that for Infinitival/Clausal-complement verbs, the infinitival complement was preferred over the that-complement. For the Infinitival/Gerundive category, it was clear that the preference was overwhelmingly for the gerund, especially in the NP environment. The preference of the gerund over the inifinitive can be explained by native language transfer. The preference of the gerund is expected because the gerund exists in Arabic but the infinitive does not exist. In the Anderson (1976) and Schwarte (1982) studies, they found the opposite to be true; i.e., the infinitive was preferred over the gerund.

6.5. Is There a Decrease in Complement Selection Errors as the Years of Language Study Increase?

Although complement selection errors decrease as the years of studying English language increase, the decrease of errors was not very significant. Students who had started learning English in an elementary school in an Arabic-speaking country performed better than those who did not. This was shown in Table 5.30. As mentioned before, the

differences in the percentages of correct response were not so significant. The students in the fourth level as a whole did not perform better than those in the other levels. So it seems that the number of years of English study does not cause a better acquisition of the subcategorization features of the infinitival verbs.

In addition to length of language instruction, the type of language instruction was also examined. As illustrated in Table 5.30, studying abroad did not seem to affect English proficiency. The mean score for those students who had studied in U.S.A. or England for a few years was slightly higher than the other students. But the difference in the percentages was not very significant.

6.6. What Role Does Transfer Play, Either in the Selection of a Correct Complement or in Preference?

Some of the predictions of the contrastive analysis a priori turned out to be true. The overgeneralization of the gerund was predicted by the contrastive analysis (see page 30) and can be explained by native language transfer. The overgeneralization of the infinitive was not predicted by contrastive analysis because in Arabic there is no infinitival complement. The only explanation for the overgeneralization and the preference of the infinitival complement in the Infin/That category was what Anderson (1976) called the "economy strategy", i.e., the preference of shorter

complements. It seems that there is a universal tendency for students from different first language backgrounds to prefer and overgeneralize the infinitive (Anderson, 1976; Hart and Schacter, 1976; Schwarte, 1982). Although there was a preference for the infinitive in the Infin/That category, the gerund was preferred over the infinitive in the Infin/Gerund category, which can be explained by native language transfer. It seems that there is no reason, as Schachter (1974) says, to assume that only one approach will answer all the questions about second language acquisition. The explanation of the second language learning process could be provided by a combination of approaches, i.e., contrastive analysis a priori and error analysis.

6.7. Do the Rankings of Difficulty Vary from One Individual to the Other?

In order to determine if the individual rankings were significantly correlated, they were compared with each other. It was found that there was a great deal of variation among the subjects in each level. When it comes to the correlation between the group ranking and the individual rankings for the four levels, it was found that only sixteen students out of one hundred students had rankings which were significantly correlated with the group-derived ranking. This indicates that individual rankings were being misrepresented by rankings based on group data for the four levels.

Using Bart and Krus's theoretical ordering method, it was found that there was an invariant hierarchy of difficulty for the acquisition of English infinitival sentential complementation by adult speakers of Arabic. On the other hand, using Guttman scaling, it was found that rankings of difficulty varied from individual to individual, and the individual rankings were being misrepresented by group ranking. The two types of rankings are based on two different methodologies. The first is Bart and Krus's theoretical ordering method; it is also called the "tree method". It is designed to determine the logical relationship among items. In other words, the method seeks to determine groups of items acquired together. In Bart and Krus's method, there must be a certain number of subjects getting high percentages on an item and low percentages on another item in order to determine the hierarchy of difficulty and the sequential relationship between these two items. The Guttman scaling which looks not at the number of subjects that had difficulty with the items, but simply the number of correct or incorrect items. In the Guttman analysis, individual differences are averaged so that it is not readily apparent whether most of the students had about the same amount of difficulty or whether some students found the item easy and others found it difficult.

Because the Guttman analysis does not take into account

the number of individuals having difficulty with the items, it will not always be an accurate mirror of the individual rankings. This would argue for using the Bart and Krus method of analysis because it is more precise at reflecting individual trends than the Guttman scaling.

6.8. Conclusion

In this study, it was found that the rankings of difficulty varied from individual to individual and the individual rankings were being misrepresented by group ranking. Such results verify the findings in the Rosansky (1976) and Schwarte (1982) studies. It seems that language is not learned in the same way by every individual. Schwarte (1982) describes the language learning process to be "very individualistic." Researchers, as she says, must not make claims about the language acquisition process based upon cross-sectional group data. In order to describe the language learning process adequately, she suggests that more detailed studies of individual language learners be done.

Another important finding in this study is that in designing a test, a researcher must set the questions in a way that would not give the subjects an opportunity to avoid the structures that they do not control. For example, if the researcher wants to test if the learners know the subcategorization features of verbs which allow two complements,

the questions must be set up in such a way that the learners have to write every possible complement. In the translation section and the other sections of the free part of the test used in this study, learners used only the complements about whose correctness they were sure and avoided the other possible complements that they did not know. If the multiple choice section had not been included, the percentages of correct responses would have been very high and the hierarchy of difficulty for the infinitival subcategorization categories would have differed. The result would have been interpreted that the Arab students have no difficulty in the acquisition of the subcategorization features of the infinitival verbs.

The order of acquisition found in this study needs to be corroborated by studies based on different methods of data collection. If other studies corroborated the order of acquisition of structures found in this study, ESL teaching materials for native speakers of Arabic could be sequenced accordingly.

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9. APPENDIX A. THE TEST

Name:

Age:

Educational Level:

Number of Years of English Study at:

Elementary school: _____

Intermediate school: _____

Secondary school: _____

Have you ever studied English outside of Saudi Arabia:

Yes _____ No _____

If yes, where? _____

What level? _____

For how long? _____

The Test

I. Translate from English into Arabic

1. The mother wants her daughter to go to school.

2. Mohammed expected that Ali will go to the garden.

3. I heard the boy singing.

4. Ali needs to see the doctor.

5. Ahmed planned that he will visit Mekka.

6. I saw the tree fall.

7. Fatma likes reading Quran.

II. Translate from Arabic into English

١- امرني ابي ان ازور عمي ٠

٢- انتهت فاطمة من تناول طعام الغذاء في تمام الساعة الثالثة ٠

٣- تحتاج هدى لشراء ثوب جديد ٠

٤- وعدت البنت بأن تنظف المنزل ٠

٥- تعتقد هدى بأنها ستستطيع السفر الى الظهران يوم الخميس القادم ٠

٦- بدأت فاطمة بالاجابة على الاسئلة ٠

٧- تأمل سعاد أن تشترى بيتا جديدا ٠

٨- سمعت محمد يقرأ الكتاب ٠

٩- تحتاج فاطمة أن يشترى لها على بعض الاشياء ٠

١٠- وعد محمد والده ان يذاكر دروسة ٠

١١- حاول الرجل حمل الامتعة ولكنه لم يتمكن من ذلك .

١٢- يريد احمد السفر الى لندن في الصيف القادم .

١٣- رأيت جارتي سعاد تغسل ثيابها .

١٤- بدأ علي الذهاب الى المدرسة في الشهر الماضي .

١٥- توقع محمد ان ينتهي علي من عمله في الساعة الرابعة .

III. Combine the following sentences. Please use the Infinitive, the That-complement, or the Gerund (-ing form).

Example:

John stopped it. John was reading a book.

John stopped reading the book.

1. Ali likes it. Ali reads stories.

2. I need Fatima. Fatima helps me.

3. My father decided it. I have to buy a new car.

4. I saw it. The policeman arrested the thief.

5. I want it. I go to Egypt.

6. The teacher thinks it. The students will do well in the exam.

7. Mohammed promised it. Mohammed fights the enemy.

IV. Fill in the blanks with the correct form of word(s) in parentheses:

Example:

The teacher knows where the student is .... (to be)

1. Ali wants ..... (Ali leave).

2. We enjoyed ..... (see) you and ..... (hear) all your news.

3. I began ..... (look) for the missing papers a few days ago, but now I must stop ..... (try) to find them.

4. Suad hopes ..... (her father return).

5. Ali expects ..... (Ali find) a job by next week.

6. I need Fatima ..... (play) with Huda.

7. I saw the girl ..... (go to school).

8. We think ..... (my uncle arrive) from London next Friday.

V. Complete the following sentences by selecting the correct word or phrase and circling the correct answer:

Note: Sometimes you may find more than one correct answer. Please circle all the correct ones.

1. John ordered ..... home early.

   a. me going
   b. I go
   c. me to go
   d. that I go
   e. to go

2. Ali expects ..... me next summer.

   a. to visited
   b. to have been visiting
   c. that he will visit
   d. visiting
   e. to visit

3. I hope ..... hard.

   a. him to study
   b. his studying
   c. that he will study
   d. him to studied
   e. that he would study

4. Start ..... the exercise now, and stop ..... as soon as I tell you.

   a. doing
   b. to do
   c. that you do
   d. to done
   e. to have done

   a. to write
   b. that you write
   c. to written
   d. writing
   e. to have been writing

5. I think ..... in the garden.

   a. them to play
   b. them playing
   c. that they are playing
   d. them to played
   e. for them to play

6. I heard Fatma ..... stories to her child.

   a. that she tells
   b. telling
   c. to tell
   d. tell
   e. told

7. Ali needs ..... to the doctor.

   a. going
   b. to go
   c. that he goes
   d. to went
   e. to have been going

8. The doctor wants ..... in bed for three days.

   a. Ali to stayed
   b. that Ali stays
   c. Ali staying
   d. Ali had stayed
   e. Ali to stay

9. I hope ..... the exam.

   a. that I pass
   b. to passed
   c. I had passed
   d. to pass
   e. passing

10. Ali decided ..... the following day.

    a. that Mohammed must leave
    b. for Mohammed to leave
    c. Mohammed leave
    d. Mohammed leaving
    e. Mohammed left

11. I promised him ..... the truth.

    a. I telling
    b. to tell
    c. telling
    d. to told
    e. that I would tell

12. I began ..... a novel yesterday.

    a. read
    b. to have read
    c. to read
    d. that I read
    e. reading

13. He wants her ..... the house today.

    a. that she cleans
    b. had cleaned
    c. cleaning
    d. to clean
    e. having cleaned

14. I heard .....

    a. the dog barking
    b. that the dob barks
    c. the dog to bark
    d. the dog bark
    e. the dog have barked

15. I told him ..... to school.

    a. to go
    b. that he should go
    c. to went
    d. going
    e. to be go

16. We need ..... our work today.

    a. that we finish
    b. finish
    c. to finish
    d. to have finished
    e. to be finish

17. John had decided ..... to the movie.

    a. to go
    b. going
    c. that he would go
    d. to went
    e. to have gone

18. The boy wants ..... his father today.

    a. to have seen
    b. to saw
    c. seeing
    d. to see
    e. that he sees

19. I like ..... television.

    a. to watch
    b. that I watch
    c. I have watched
    d. to watching
    e. watching

20. Mary tried ..... to bed early.

    a. to went
    b. that she goes
    c. be going
    d. going
    e. to go

21. My father wants ..... this evening.

    a. to worked
    b. working
    c. to work
    d. that he has worked
    e. that he works

22. We think ..... enough time.

    a. to have
    b. having
    c. that we have
    d. to had
    e. to be having

23. They started ..... the lesson before the teacher came in.

    a. to written
    b. writing
    c. that they write
    d. to write
    e. to be writing

23. He planned ..... to Chicago next summer.

    a. that he would go
    b. to went
    c. to go
    d. going
    e. to have been going

25. I decided ..... my uncle next Friday.

    a. visiting
    b. to visit
    c. that I would visit
    d. to have visited
    e. being visiting

26. Mary wanted ..... basketball.

    a. that they play
    b. them to play
    c. their playing
    d. they played
    e. that they have played

27. I saw my child ..... the road alone.

    a. crossing
    b. to cross
    c. that he crossed
    d. cross
    e. is crossing

28. I enjoy .....

    a. that I fish
    b. to fished
    c. to fish
    d. fishing
    e. be fishing

29. We need ..... some fruits for tomorrow.

    a. we buy
    b. to buy
    c. buying
    d. that we buy
    e. to have bought

30. I told Ali ..... the book.

    a. to have taken
    b. that he could take
    c. taking
    d. to take
    e. to took

31. I heard .....

    a. Mary singing
    b. that Mary sings
    c. Mary to sing
    d. Mary sing
    e. Mary has sung

32. The teacher needs the students ..... class early.

    a. leaving
    b. to leave
    c. that they leave
    d. to left
    e. have left

10. APPENDIX B. INDIVIDUAL SCORES

10.1. Individual Scores in the Free Part of the Test for the Four Levels

Table 10.1. Level 1

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	100	100	100	100	100
2	100	100	80	100	100	100
3	80	100	80	100	83.33	100
4	100	100	100	100	100	100
5	80	100	100	100	100	100
6	80	100	100	100	100	100
7	80	60	60	60	83.33	83.33
8	80	100	80	100	83.33	100
9	100	100	100	100	100	100
10	80	100	100	100	100	100
11	60	100	60	100	83.33	100
12	100	100	80	100	83.33	100
13	40	100	60	100	16.66	100
14	80	80	80	100	50	100
15	60	100	60	100	66.66	83.33
16	80	100	80	100	66.66	100
17	100	100	80	100	83.33	100
18	100	60	80	100	100	100
19	100	100	100	100	100	100
20	80	100	80	100	83.33	100
21	100	100	100	100	66.66	100
22	40	80	100	100	100	100
23	100	100	100	100	100	100
24	80	100	80	100	66.66	100
25	100	100	80	100	83.33	100

Table 10.2. Level 2

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	80	100	80	100	100	100
2	100	100	100	100	100	100
3	100	100	100	100	100	100
4	100	100	100	100	100	100
5	100	100	80	80	100	100
6	100	100	80	80	100	100
7	100	100	80	100	100	100
8	100	100	100	100	66.66	100
9	100	100	80	100	83.33	100
10	60	100	60	100	83.33	100
11	80	100	60	100	83.33	100
12	80	100	80	100	100	100
13	80	100	80	100	66.66	100
14	60	100	60	100	100	100
15	40	60	80	80	50	83.33
16	100	100	100	100	83.33	100
17	100	100	80	100	100	100
18	100	100	60	100	100	100
19	100	100	100	100	83.33	100
20	100	100	100	80	100	100
21	80	80	80	100	100	100
22	80	80	80	80	100	100
23	80	80	100	100	100	100
24	80	100	60	100	66.66	100
25	80	100	80	100	100	100

Table 10.3. Level 3

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	100	80	100	83.33	100
2	80	100	100	100	100	100
3	80	100	100	80	100	100
4	60	80	80	80	100	100
5	80	80	100	100	100	100
6	100	100	80	100	83.33	100
7	100	100	80	100	83.33	100
8	100	100	100	100	100	100
9	100	100	100	100	100	100
10	100	100	100	100	100	100
11	80	100	80	100	83.33	100
12	80	100	100	100	83.33	83.33
13	60	80	100	100	100	100
14	80	60	100	100	100	100
15	80	60	100	100	83.33	100
16	100	100	100	80	100	100
17	80	100	80	100	100	100
18	100	80	100	80	100	100
19	100	100	80	100	83.33	100
20	80	100	100	100	100	100
21	80	100	100	100	83.33	100
22	80	80	100	100	100	100
23	80	100	80	100	100	100
24	100	100	100	100	100	100
25	100	100	100	100	100	100

Table 10.4. Level 4

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	100	100	100	100	100
2	80	90	100	90	66.66	100
3	100	100	100	100	83.33	100
4	80	100	80	100	83.33	100
5	80	100	100	100	100	100
6	100	100	60	100	83.33	100
7	80	100	100	100	100	100
8	100	100	100	100	100	100
9	100	100	80	100	100	100
10	60	80	80	80	100	100
11	100	80	80	100	83.33	100
12	80	80	100	100	100	100
13	80	100	60	80	100	100
14	60	100	100	100	100	100
15	80	100	80	100	100	100
16	80	100	100	100	83.33	100
17	80	100	80	100	83.33	100
18	100	100	100	100	83.33	100
19	80	100	100	100	83.33	100
20	100	100	60	100	100	100
21	100	100	90	100	100	100
22	80	100	100	100	83.33	100
23	60	80	80	80	66.66	83.33
24	80	80	80	80	100	100
25	100	100	100	100	100	100

10.2. Individual Scores in the Multiple Choice Part of the Test for the Four Levels

Table 10.5. Level 1

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	80	90	40	41.66	80
2	100	100	70	60	41.66	70
3	100	90	80	70	50	90
4	100	100	90	70	75	100
5	100	80	100	60	41.66	80
6	90	100	70	46.66	41.66	60
7	100	100	70	76.66	50	60
8	70	50	83.33	53.33	54.16	100
9	100	100	70	50	41.66	50
10	70	70	90	80	58.33	73.33
11	40	50	80	73.33	37.5	90
12	100	90	76.66	80	50	80
13	90	50	80	66.66	16.66	80
14	90	100	90	66.66	50	80
15	90	100	60	30	50	50
16	100	80	90	73.33	45.83	90
17	80	80	70	50	41.66	70
18	70	90	60	76.66	37.5	50
19	100	100	100	90	50	76.66
20	100	100	70	40	41.66	50
21	90	90	66.66	53.33	41.66	76.66
22	100	100	70	50	50	50
23	70	90	73.33	63.33	50	93.33
24	80	60	50	50	41.66	40
25	100	80	80	80	50	90

Table 10.6. Level 2

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	80	100	70	60	41.66	60
2	100	90	70	50	41.66	50
3	100	100	80	100	41.66	90
4	80	100	70	66.66	79.66	100
5	100	100	60	50	70.83	90
6	100	70	66.66	66.66	50	90
7	90	100	100	53.33	41.66	80
8	90	80	46.66	73.33	41.66	100
9	100	90	80	93.33	41.66	90
10	90	100	70	60	41.66	80
11	90	100	63.33	76.66	41.66	90
12	90	70	80	73.33	41.66	66.66
13	100	100	90	100	66.66	90
14	80	80	70	30	54.17	50
15	90	90	80	70	41.66	70
16	80	90	66.66	63.33	41.66	100
17	100	70	80	46.66	41.66	90
18	100	90	80	90	41.66	70
19	100	100	80	56.66	41.66	70
20	90	70	63.33	50	41.66	100
21	100	46.66	60	46.66	41.66	80
22	80	70	90	73.33	70.83	90
23	70	70	70	86.66	58.33	100
24	90	100	60	73.33	50	80
25	100	86.66	100	66.66	58.33	90

Table 10.7. Level 3

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	80	50	60	41.66	70
2	90	80	60	56.66	54.16	80
3	100	100	70	50	41.66	50
4	100	100	70	50	50	60
5	100	90	70	40	41.66	50
6	100	100	90	66.66	41.66	80
7	100	100	90	80	41.66	50
8	100	90	70	60	41.66	80
9	90	100	80	80	41.66	90
10	100	100	80	83.33	41.66	90
11	100	100	70	50	41.66	50
12	100	100	80	50	41.66	50
13	100	100	70	80	41.66	90
14	100	100	70	40	41.66	50
15	90	80	80	53.33	58.33	90
16	80	56.66	70	46.66	41.66	90
17	70	80	56.66	36.66	50	90
18	100	80	60	40	41.66	70
19	100	90	40	50	41.66	80
20	100	100	80	56.66	41.66	70
21	90	100	80	60	41.66	70
22	90	100	100	80	50	90
23	83.33	60	80	60	41.66	90
24	100	90	90	80	100	90
25	90	100	90	100	79.16	90

Table 10.8. Level 4

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	100	80	80	50	70
2	90	80	76.66	50	33.33	90
3	90	100	56.66	56.66	41.66	70
4	100	100	70	70	41.66	50
5	90	80	100	73.33	75	100
6	80	70	50	60	41.66	100
7	100	100	80	80	41.66	90
8	100	100	100	90	41.66	80
9	100	100	70	53.33	41.66	60
10	80	70	90	53.33	83.33	90
11	80	90	90	90	41.66	80
12	100	100	90	70	41.66	60
13	70	100	73.33	86.66	70.83	80
14	100	100	90	80	41.66	100
15	100	90	80	66.66	83.33	90
16	60	50	83.33	66.66	62.5	100
17	80	80	80	73.33	37.5	100
18	80	100	70	66.66	41.66	60
19	100	100	90	53.33	41.66	60
20	100	100	80	70	58.33	80
21	100	100	80	100	62.5	90
22	80	100	90	66.66	33.33	80
23	80	90	60	33.33	54.16	60
24	80	80	60	50	41.66	50
25	90	100	90	86.66	91.66	86.66

10.3. Individual Scores for the Four Levels in the Whole Test

Table 10.9. Level 1

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	90	95	70	76.66	90.9
2	100	100	75	80	76.66	86.36
3	90	95	80	85	70	95.45
4	100	100	95	85	90	100
5	90	90	100	80	76.66	90.9
6	83.3	100	85	73.33	76.66	81.81
7	90	80	65	68.33	70	72.72
8	75	75	81.66	76.66	71.66	100
9	100	100	85	75	76.66	77.27
10	75	85	95	90	83.33	87.87
11	50	75	70	86.66	65	95.45
12	100	95	78.33	90	70	90.9
13	61.6	75	70	83.33	16.66	90.9
14	85	90	85	83.33	50	90.9
15	75	100	60	65	60	68.18
16	90	90	85	86.66	78.33	95.45
17	90	90	75	75	76.66	86.36
18	85	75	70	88.33	75	77.27
19	100	100	100	95	80	89.39
20	90	100	75	70	76.66	77.27
21	95	95	83.33	76.66	76.66	89.39
22	70	90	85	75	80	77.27
23	85	95	86.66	81.66	80	96.96
24	90	80	65	75	76.66	72.72
25	100	90	80	90	80	95.45

Table 10.10. Level 2

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	80	100	75	80	76.66	81.81
2	100	95	85	75	76.66	77.27
3	100	100	90	100	76.66	95.45
4	90	100	85	83.33	91.66	100
5	100	100	70	65	88.33	95.45
6	100	85	73.33	73.33	80	95.45
7	95	100	90	76.66	76.66	90.91
8	95	90	73.33	86.66	56.66	100
9	100	95	80	96.66	66.66	95.45
10	75	100	65	80	66.66	90.91
11	85	100	61.66	88.33	66.66	95.45
12	85	85	80	86.33	76.66	84.84
13	90	100	85	100	66.66	95.45
14	70	90	65	65	81.66	77.27
15	61.66	75	80	75	46.66	77.27
16	90	95	83.33	81.66	66.66	100
17	100	85	80	73.33	76.66	95.45
18	100	95	70	95	76.66	86.36
19	100	100	90	78.33	66.66	86.36
20	95	85	81.66	65	76.66	100
21	90	63.33	70	73.33	76.66	90.91
22	80	75	85	76.66	88.33	95.45
23	75	75	85	93.33	83.33	100
24	85	100	60	86.66	60	90.91
25	90	93.33	90	83.33	83.33	95.45

Table 10.11. Level 3

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	90	65	80	66.66	86.36
2	85	90	80	78.33	81.66	90.91
3	90	100	85	65	76.66	77.27
4	80	90	75	65	80	81.81
5	90	85	85	70	76.66	77.27
6	100	100	85	83.33	66.66	90.91
7	100	100	85	90	66.66	77.27
8	100	95	85	80	76.66	90.91
9	95	100	90	90	76.66	95.45
10	100	100	90	91.66	76.66	95.45
11	90	100	75	75	66.66	77.27
12	90	100	90	75	66.66	68.18
13	80	90	85	90	76.66	95.45
14	90	80	85	70	76.66	77.27
15	85	70	90	76.66	73.33	95.45
16	90	78.33	85	63.33	76.66	95.45
17	75	90	68.33	68.33	80	95.45
18	100	80	80	60	76.66	86.36
19	100	95	60	75	66.66	90.91
20	90	100	90	78.33	76.66	86.36
21	85	100	90	80	66.66	86.36
22	85	90	100	90	80	95.45
23	81.66	80	80	80	76.66	95.45
24	100	95	95	90	100	95.45
25	95	100	95	100	91.66	95.45

Table 10.12. Level 4

Subject	Infin-NP	Infin-END	Infin-NP/That	Infin-END/That	Infin-NP/Gerund	Infin-END/Gerund
1	100	100	90	90	80	86.36
2	85	85	88.33	70	53.33	95.45
3	95	100	78.33	78.33	66.66	86.36
4	90	100	75	85	66.66	85
5	85	90	100	86.66	90	100
6	90	85	55	80	66.66	100
7	90	100	90	90	76.66	95.45
8	100	100	100	95	76.66	90.91
9	100	100	75	76.66	76.66	81.82
10	70	73.33	85	66.66	93.33	95.45
11	90	83.33	85	95	66.66	90.91
12	90	90	95	85	76.66	81.82
13	75	100	66.66	83.33	88.33	90.91
14	80	100	95	90	76.66	100
15	90	95	80	83.33	93.33	95.45
16	70	75	91.66	83.33	75	100
17	80	90	80	86.66	65	100
18	90	100	85	83.33	66.66	81.82
19	90	100	95	76.66	66.66	81.82
20	100	100	70	85	83.33	90.91
21	100	100	85	100	85	95.45
22	80	100	95	83.33	63.33	90.91
23	70	85	70	56.66	61.66	72.73
24	80	80	70	65	76.66	77.27
25	95	100	95	93.33	96.66	93.94

11. APPENDIX C. SPEARMAN RANK CORRELATION MATRICES FOR THE FOUR LEVELS

11.1. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level One

OBS	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
1	100.00	100.00	90.00	100	90.00	83.30	90.00	75.00	100.00	75.00	50.00	100.00	61.50
2	90.00	100.00	95.00	100	90.00	100.00	80.00	75.00	100.00	85.00	75.00	95.00	75.00
3	95.00	75.00	80.00	95	100.00	85.00	65.00	81.66	85.00	95.00	70.00	78.33	70.00
4	70.00	80.00	85.00	85	80.00	73.33	68.33	76.66	75.00	90.00	86.66	90.00	83.33
5	75.66	76.66	70.00	90	76.66	76.66	70.00	71.66	76.66	83.33	65.00	70.00	16.66
6	90.90	86.36	95.45	100	90.90	81.81	72.72	100.00	77.27	87.87	95.45	90.90	90.90

OBS	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	AV
1	85.00	75.00	90.00	90.00	85.00	100.00	90.00	95.00	70.00	85.00	90.00	100.00	86.790
2	90.00	100.00	90.00	90.00	75.00	100.00	100.00	95.00	90.00	95.00	80.00	90.00	90.200
3	85.00	60.00	85.00	75.00	70.00	100.00	75.00	83.33	85.00	86.65	65.00	80.00	80.992
4	83.33	55.00	86.66	75.00	88.33	95.00	70.00	76.66	75.00	81.66	75.00	90.00	80.198
5	50.00	60.00	78.33	76.66	75.00	80.00	76.66	76.66	80.00	80.00	76.66	80.00	72.397
6	90.90	68.18	95.45	86.36	77.27	89.39	77.27	89.39	77.27	96.95	72.72	95.45	87.086

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	6	87.09333333	11.42867738	90.44999695	70.00000000	100.00000000
S2	6	86.33666667	11.27550561	83.17999268	75.00000000	100.00000000
S3	6	85.90833333	9.79032260	87.50000000	70.00000000	95.45000000
S4	6	95.00000000	6.32455532	97.50000000	85.00000000	100.00000000
S5	6	87.92666667	8.40206324	90.00000000	75.66000000	100.00000000
S6	6	83.35000000	9.24635712	82.55499268	73.33000000	100.00000000
S7	6	74.34166667	9.18789294	71.35998535	65.00000000	90.00000000
S8	6	79.99666667	10.32924715	75.82998657	71.66000000	100.00000000
S9	6	85.65500000	11.63386737	81.13499451	75.00000000	100.00000000
S10	6	86.03333333	6.77671208	86.43499756	75.00000000	95.00000000
S11	6	73.68500000	16.08591154	72.50000000	50.00000000	95.45000000
S12	6	87.37166667	11.14046752	90.44999695	70.00000000	100.00000000
S13	6	66.24833333	26.34678152	72.50000000	15.66000000	90.90000000
S14	6	80.70500000	15.34220812	85.00000000	50.00000000	90.90000000
S15	6	71.36333333	15.11396926	66.58999634	60.00000000	100.00000000
S16	6	87.67333333	5.77433517	88.32998657	78.33000000	95.45000000
S17	6	82.17000000	7.39394076	81.50997925	75.00000000	90.00000000
S18	6	78.43333333	6.88643788	76.13499451	70.00000000	88.33000000
S19	6	94.06500000	8.07745938	97.50000000	80.00000000	100.00000000
S20	6	81.48833333	11.22780195	76.96498108	70.00000000	100.00000000
S21	6	86.00666667	8.42724075	86.35998535	75.66000000	95.00000000
S22	6	79.84500000	7.15836224	78.63499451	70.00000000	90.00000000
S23	6	87.54666667	6.97193995	85.82998657	80.00000000	96.96000000
S24	6	76.56333333	8.28601151	75.82998657	65.00000000	90.00000000
S25	6	89.24166667	8.07777300	90.00000000	80.00000000	100.00000000
AV	6	82.94383333	6.43719574	83.89099121	72.39700000	90.20000000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S1	1.00000 0.0000	0.23191 0.6584	0.25714 0.6228	0.69825 0.1228	0.69573 0.1248	0.60000 0.2080	0.37143 0.4685	0.23191 0.6584	0.75370 0.0835	-0.20000 0.7040	-0.42857 0.3965	0.48571 0.3287
S2	0.23191 0.6584	1.00000 0.0000	0.75370 0.0835	0.70845 0.1151	-0.05882 0.9119	0.31387 0.5379	0.92763 0.0077	-0.17647 0.7380	0.58824 0.2194	-0.60876 0.1997	0.00000 1.0000	0.92763 0.0077
S3	0.25714 0.6228	0.75370 0.0835	1.00000 0.0000	0.75897 0.0801	0.40584 0.4247	0.31429 0.5441	0.60000 0.2080	0.46382 0.3542	0.40584 0.4247	-0.08571 0.8717	0.54286 0.2657	0.77143 0.0724
S4	0.69825 0.1228	0.70845 0.1151	0.75897 0.0801	1.00000 0.0000	0.52363 0.2863	0.69825 0.1228	0.75897 0.0801	0.15401 0.7708	0.63166 0.0401	-0.39466 0.4387	-0.03036 0.9545	0.75897 0.0801
S5	0.69573 0.1248	-0.05882 0.9119	0.40584 0.4247	0.52363 0.2863	1.00000 0.0000	0.60876 0.1997	-0.11595 0.8268	0.76471 0.0765	0.47059 0.3462	0.49281 0.3206	0.23191 0.6584	0.23191 0.6584
S6	0.60000 0.2080	0.31887 0.5379	0.31429 0.5441	0.69825 0.1228	0.60876 0.1997	1.00000 0.0000	0.31429 0.5441	0.02899 0.9565	0.89865 0.0149	-0.02857 0.9572	-0.20000 0.7040	0.42857 0.3965
S7	0.37143 0.4685	0.92763 0.0077	0.60000 0.2080	0.75897 0.0801	-0.11595 0.8268	0.31429 0.5441	1.00000 0.0000	-0.34786 0.4993	0.63775 0.1731	-0.82857 0.0416	-0.25714 0.6228	0.82857 0.0416
S8	0.23191 0.6584	-0.17647 0.7380	0.46382 0.3542	0.15401 0.7708	0.76471 0.0765	0.02899 0.9565	-0.34786 0.4993	1.00000 0.0000	-0.11765 0.8243	0.72471 0.1032	0.69573 0.1246	0.05798 0.9131
S9	0.75370 0.0835	0.58824 0.2194	0.40584 0.4247	0.63166 0.0401	0.47059 0.3462	0.89865 0.0149	0.63775 0.1731	-0.11765 0.8243	1.00000 0.0000	-0.37685 0.4615	-0.40584 0.4247	0.69573 0.1248
S10	-0.20000 0.7040	-0.60876 0.1997	-0.08571 0.8717	-0.39466 0.4387	0.49281 0.3206	-0.02857 0.9572	-0.82857 0.0416	0.72471 0.1032	-0.37685 0.4615	1.00000 0.0000	0.60000 0.2080	-0.42857 0.3965
S11	-0.42857 0.3965	0.00000 1.0000	0.54286 0.2657	-0.03036 0.9545	0.23191 0.6584	-0.20000 0.7040	-0.25714 0.6228	0.69573 0.1248	-0.40584 0.4247	0.60000 0.2080	1.00000 0.0000	-0.02857 0.9572
S12	0.48571 0.3287	0.92763 0.0077	0.77143 0.0724	0.75897 0.0801	0.23191 0.6584	0.42857 0.3965	0.82857 0.0416	0.05798 0.9131	0.69573 0.1248	-0.42857 0.3965	-0.02857 0.9572	1.00000 0.0000
S13	-0.20000 0.7040	0.20292 0.6998	0.71429 0.1108	0.15179 0.7741	0.37685 0.4615	-0.08571 0.8717	-0.08571 0.8717	0.78269 0.0657	-0.20292 0.6998	0.54286 0.2657	0.94286 0.0048	0.25714 0.6228
S14	0.46382 0.3542	0.51471 0.2961	0.89865 0.0149	0.83166 0.0401	0.72059 0.1062	0.57977 0.2278	0.40584 0.4247	0.60294 0.2052	0.54412 0.2644	0.11595 0.8268	0.49281 0.3206	0.60876 0.1997
S15	0.23191 0.6584	0.97059 0.0013	0.81168 0.0499	0.73925 0.0931	0.08824 0.8680	0.46382 0.3542	0.84067 0.0361	-0.05882 0.9119	0.64706 0.1649	-0.43483 0.3889	0.11595 0.8268	0.92763 0.0077
S16	0.34785 0.4993	0.76471 0.0765	0.98561 0.0003	0.77005 0.0732	0.41176 0.4173	0.26090 0.6175	0.63775 0.1731	0.47059 0.3462	0.41176 0.4173	-0.14494 0.7841	0.46382 0.3542	0.81168 0.0499
S17	0.41194 0.4170	0.89562 0.0158	0.61791 0.1911	0.84416 0.0345	0.00000 1.0000	0.50022 0.3123	0.97101 0.0012	-0.32839 0.5251	0.74635 0.0883	-0.76504 0.0763	-0.23540 0.6534	0.79446 0.0590

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S18	-0.23191 0.6584	0.45588 0.3635	0.31887 0.5379	-0.12321 0.8161	-0.39706 0.4357	-0.60876 0.1997	0.31887 0.5379	0.04412 0.9339	-0.30882 0.5515	-0.23191 0.6584	0.20292 0.6998	0.43483 0.3889
S19	0.57682 0.2307	0.33882 0.5112	0.21251 0.6860	0.41935 0.4078	0.52363 0.2863	0.75897 0.0801	0.21251 0.6860	0.09241 0.8618	0.77005 0.0732	0.09108 0.8638	-0.27323 0.8004	0.57682 0.2307
S20	0.42857 0.3965	0.81168 0.0499	0.60000 0.2080	0.88041 0.0206	0.11595 0.8268	0.65714 0.1562	0.88571 0.0188	-0.28989 0.5774	0.81168 0.0499	-0.65714 0.1562	-0.20000 0.7040	0.71429 0.1108
S21	0.67675 0.1398	0.80606 0.0528	0.70619 0.1168	0.93796 0.0057	0.44781 0.3732	0.76504 0.0763	0.79446 0.0590	0.02985 0.9552	0.92548 0.0081	-0.41194 0.4170	-0.14712 0.7809	0.88273 0.0198
S22	-0.14285 0.7872	-0.23191 0.6584	-0.08571 0.8717	0.09108 0.8638	0.23191 0.6584	0.60000 0.2080	-0.25714 0.6228	-0.05798 0.9131	0.23191 0.6584	0.31429 0.5441	0.14286 0.7872	-0.31429 0.5441
S23	0.42857 0.3965	0.37685 0.4615	0.82857 0.0416	0.75897 0.0801	0.78269 0.0657	0.60000 0.2080	0.25714 0.6228	0.66674 0.1481	0.49281 0.3206	0.25714 0.6228	0.54286 0.2657	0.48571 0.3287
S24	0.08571 0.8717	0.75370 0.0835	0.14286 0.7872	0.33395 0.5177	-0.52179 0.2883	0.14286 0.7872	0.82857 0.0416	-0.75370 0.0835	0.46382 0.3542	-0.88571 0.0188	-0.54286 0.2657	0.60000 0.2080
S25	0.41194 0.4170	0.82099 0.0452	0.76504 0.0763	0.62531 0.1843	0.13434 0.7997	0.02942 0.9559	0.76504 0.0763	0.19405 0.7126	0.37318 0.4662	-0.44137 0.3809	0.08827 0.8679	0.88273 0.0198
AV	0.42857 0.3965	0.72471 0.1032	0.88571 0.0188	0.88041 0.0206	0.55078 0.2574	0.71429 0.1108	0.60000 0.2080	0.31887 0.5379	0.72471 0.1032	-0.08571 0.8717	0.31429 0.5441	0.77143 0.0724

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S1	-0.20000 0.7040	0.46382 0.3542	0.23191 0.6584	0.34786 0.4993	0.41194 0.4170	-0.23191 0.6584	0.57682 0.2307	0.42857 0.3965	0.67676 0.1398	-0.14286 0.7872	0.42857 0.3965	0.08571 0.8717
S2	0.20292 0.6998	0.51471 0.2961	0.97059 0.0013	0.76471 0.0765	0.89562 0.0158	0.45588 0.3635	0.33882 0.5112	0.81168 0.0499	0.80606 0.0528	-0.23191 0.6584	0.37685 0.4615	0.75370 0.0835
S3	0.71429 0.1108	0.89865 0.0149	0.81168 0.0499	0.98561 0.0003	0.61791 0.1911	0.31887 0.5379	0.21251 0.6860	0.60000 0.2080	0.70619 0.1168	-0.08571 0.8717	0.82857 0.0416	0.14286 0.7872
S4	0.15179 0.7741	0.83156 0.0401	0.73925 0.0931	0.77005 0.0732	0.84416 0.0345	-0.12321 0.8161	0.41935 0.4078	0.88041 0.0206	0.93796 0.0057	0.09108 0.8638	0.75897 0.0801	0.33395 0.5177
S5	0.37685 0.4615	0.72059 0.1062	0.08824 0.8680	0.41176 0.4173	0.00000 1.0000	-0.39706 0.4357	0.52363 0.2863	0.11595 0.8268	0.44781 0.3732	0.23191 0.6584	0.78269 0.0657	-0.52179 0.2883
S6	-0.08571 0.8717	0.57977 0.2279	0.46382 0.3542	0.26090 0.6175	0.50022 0.3123	-0.60876 0.1997	0.75897 0.0801	0.65714 0.1562	0.76504 0.0763	0.60000 0.2080	0.60000 0.2080	0.14286 0.7872
S7	-0.08571 0.8717	0.40584 0.4247	0.84067 0.0361	0.63775 0.1731	0.97101 0.0012	0.31887 0.5379	0.21251 0.6860	0.88571 0.0188	0.79446 0.0590	-0.25714 0.6228	0.25714 0.6228	0.82857 0.0416
S8	0.78269 0.0657	0.60294 0.2052	-0.05882 0.9119	0.47059 0.3462	-0.32839 0.5251	0.04412 0.9339	0.09241 0.8618	-0.28989 0.5774	0.02985 0.9552	-0.05798 0.9131	0.66674 0.1481	-0.75370 0.0835

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S9	-0.20292 0.6999	0.54412 0.2644	0.64706 0.1649	0.41176 0.4173	0.74635 0.0883	-0.30882 0.5515	0.77005 0.0732	0.81168 0.0499	0.92548 0.0081	0.23191 0.6584	0.49281 0.3206	0.46382 0.3542
S10	0.54286 0.2657	0.11595 0.8268	-0.43483 0.3889	-0.14494 0.7841	-0.76504 0.0763	-0.23191 0.6584	0.09108 0.8638	-0.65714 0.1562	-0.41194 0.4170	0.31429 0.5441	0.25714 0.6228	-0.85571 0.0188
S11	0.94286 0.0048	0.49281 0.3206	0.11595 0.8268	0.46382 0.3542	-0.23540 0.6534	0.20292 0.6998	-0.27323 0.6004	-0.20000 0.7040	-0.14712 0.7809	0.14286 0.7872	0.54286 0.2657	-0.54286 0.2657
S12	0.25714 0.6225	0.60876 0.1997	0.92763 0.0077	0.81168 0.0499	0.79445 0.0590	0.43483 0.3889	0.57682 0.2307	0.71429 0.1108	0.88273 0.0198	-0.31429 0.5441	0.48571 0.3287	0.60000 0.2080
S13	1.00000 0.0000	0.63775 0.1731	0.31887 0.5379	0.66674 0.1481	-0.08827 0.8679	0.34786 0.4993	-0.03036 0.9545	-0.08571 0.8717	0.08827 0.8679	-0.02857 0.9572	0.65714 0.1562	-0.42857 0.3965
S14	0.63775 0.1731	1.00000 0.0000	0.63235 0.1779	0.86765 0.0251	0.50752 0.3041	-0.08824 0.8680	0.33882 0.5112	0.57977 0.2278	0.73142 0.0985	0.20292 0.6998	0.98561 0.0003	-0.11595 0.8268
S15	0.31887 0.5379	0.63235 0.1779	1.00000 0.0000	0.79412 0.0592	0.85084 0.0317	0.33824 0.5120	0.46203 0.3563	0.81168 0.0499	0.85084 0.0317	-0.05798 0.9131	0.52179 0.2883	0.63775 0.1731
S16	0.66674 0.1481	0.86765 0.0251	0.79412 0.0592	1.00000 0.0000	0.62694 0.1828	0.39706 0.4357	0.21561 0.6816	0.57977 0.2278	0.71660 0.1092	-0.23191 0.6584	0.78269 0.0657	0.17393 0.7417
S17	-0.08827 0.8679	0.50752 0.3041	0.85084 0.0317	0.62694 0.1828	1.00000 0.0000	0.10449 0.8438	0.28139 0.5891	0.97101 0.0012	0.86364 0.0266	-0.02942 0.9559	0.38252 0.4542	0.76504 0.0763
S18	0.34786 0.4993	-0.08824 0.8680	0.33824 0.5120	0.39706 0.4357	0.10449 0.8438	1.00000 0.0000	-0.15401 0.7708	-0.11595 0.8268	-0.02985 0.9552	-0.84067 0.0361	-0.20292 0.6998	0.34786 0.4993
S19	-0.03036 0.9545	0.33882 0.5112	0.46203 0.3563	0.21561 0.6816	0.28139 0.5891	-0.15401 0.7708	1.00000 0.0000	0.33395 0.5177	0.65657 0.1567	0.15179 0.7741	0.33395 0.5177	0.21251 0.6860
S20	-0.08571 0.8717	0.57977 0.2278	0.81168 0.0499	0.57977 0.2278	0.97101 0.0012	-0.11595 0.8268	0.33395 0.5177	1.00000 0.0000	0.88273 0.0198	0.20000 0.7040	0.48571 0.3287	0.65714 0.1562
S21	0.08827 0.8679	0.73142 0.0985	0.85084 0.0317	0.71650 0.1092	0.86364 0.0266	-0.02985 0.9552	0.65657 0.1567	0.88273 0.0198	1.00000 0.0000	0.05885 0.9118	0.64734 0.1646	0.50022 0.3123
S22	-0.02857 0.9572	0.20292 0.6998	-0.05798 0.9131	-0.23191 0.6584	-0.02942 0.9559	-0.84067 0.0361	0.15179 0.7741	0.20000 0.7040	0.05885 0.9118	1.00000 0.0000	0.31429 0.5441	-0.25714 0.6228
S23	0.65714 0.1562	0.98561 0.0003	0.52179 0.2883	0.78269 0.0657	0.38252 0.4542	-0.20292 0.6998	0.33395 0.5177	0.48571 0.3287	0.64734 0.1646	0.31429 0.5441	1.00000 0.0000	-0.25714 0.6228
S24	-0.42857 0.3965	-0.11595 0.8268	0.63775 0.1731	0.17393 0.7417	0.76504 0.0763	0.34786 0.4993	0.21251 0.6860	0.65714 0.1562	0.50022 0.3123	-0.25714 0.6228	-0.25714 0.6228	1.00000 0.0000
S25	0.35309 0.4924	0.52245 0.2876	0.74635 0.0883	0.85084 0.0317	0.65152 0.1610	0.68564 0.1319	0.21886 0.6770	0.50022 0.3123	0.65152 0.1610	-0.64734 0.1646	0.38252 0.4542	0.47079 0.3460
AV	0.48571 0.3287	0.92763 0.0077	0.84067 0.0361	0.84067 0.0361	0.70619 0.1168	-0.05798 0.9131	0.51610 0.2946	0.77143 0.0724	0.88273 0.0198	0.25714 0.6228	0.88571 0.0188	0.20000 0.7040

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S25	AV
S1	0.41194	0.42857
	0.4170	0.3965
S2	0.82099	0.72471
	0.0452	0.1032
S3	0.76504	0.88571
	0.0763	0.0188
S4	0.52531	0.88041
	0.1843	0.0206
S5	0.13434	0.55078
	0.7997	0.2574
S6	0.02942	0.71429
	0.9559	0.1108
S7	0.76504	0.60000
	0.0763	0.2080
S8	0.19405	0.31887
	0.7126	0.5379
S9	0.37318	0.72471
	0.4662	0.1032
S10	-0.44137	-0.08571
	0.3809	0.8717
S11	0.08827	0.31429
	0.8679	0.5441
S12	0.88273	0.77143
	0.0195	0.0724
S13	0.35309	0.48571
	0.4924	0.3287
S14	0.52245	0.92763
	0.2875	0.0077
S15	0.74635	0.84067
	0.0883	0.0361
S16	0.85084	0.84067
	0.0317	0.0361
S17	0.65152	0.70619
	0.1610	0.1158

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S25	AV
S18	0.68664	-0.05798
	0.1319	0.9131
S19	0.21886	0.51610
	0.6773	0.2946
S20	0.50022	0.77143
	0.3123	0.0724
S21	0.65152	0.88273
	0.1610	0.0198
S22	-0.64734	0.25714
	0.1645	0.6228
S23	0.38252	0.88571
	0.4542	0.0188
S24	0.47079	0.20000
	0.3460	0.7040
S25	1.00000	0.55907
	0.0000	0.2488
AV	0.55907	1.00000
	0.2488	0.0000

11.2. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Two

DATA 15:18 TUESDAY, SEPTEMBER 13, 1983 1

OBS	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
1	80.00	100.00	100.00	90.00	100.00	100.00	95.00	95.00	100.00	75.00	85.00	85.00	90.00
2	100.00	95.00	100.00	100.00	100.00	85.00	100.00	90.00	95.00	100.00	100.00	85.00	100.00
3	75.00	85.00	90.00	85.00	70.00	73.33	90.00	73.33	80.00	65.00	61.66	80.00	85.00
4	80.00	75.00	100.00	83.33	65.00	73.33	76.66	86.66	96.66	80.00	88.33	86.33	100.00
5	76.66	76.66	76.66	91.66	88.33	80.00	76.66	56.66	66.66	56.66	66.66	76.66	66.66
6	81.81	77.27	95.45	100.00	95.45	95.45	90.91	100.00	95.45	90.91	95.45	84.84	95.45

OBS	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	AV
1	70.00	61.66	90.00	100.00	100.00	100.00	95.00	90.00	80.00	75.00	85.00	90.00	89.27
2	90.00	75.00	95.00	85.00	95.00	100.00	85.00	63.33	75.00	75.00	100.00	93.33	91.27
3	65.00	80.00	83.33	80.00	70.00	90.00	81.66	70.00	85.00	85.00	60.00	90.00	78.13
4	65.00	75.00	81.66	73.33	95.00	78.33	65.00	73.33	76.66	93.33	86.66	83.33	81.52
5	81.66	46.65	66.66	76.66	76.66	66.66	76.66	76.66	88.33	83.33	60.00	83.33	73.99
6	77.27	77.27	100.00	95.45	86.36	86.36	100.00	90.91	95.45	100.00	90.91	95.45	91.75

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	6	82.24500000	9.04645290	80.00000000	75.00000000	100.00000000
S2	6	84.82166667	10.52727584	81.13499451	75.00000000	100.00000000
S3	6	93.68500000	9.23236427	97.72499084	75.66000000	100.00000000
S4	6	91.66500000	7.14998112	90.82998657	83.33000000	100.00000000
S5	6	86.46333333	15.37818802	91.88998413	65.00000000	100.00000000
S6	6	84.51833333	11.22664940	82.50000000	73.33000000	100.00000000
S7	6	88.20500000	9.61672657	90.45498657	76.66000000	100.00000000
S8	6	83.60833333	16.00299774	88.32998657	55.66000000	100.00000000
S9	6	88.96166667	12.94098051	95.22499084	68.66000000	100.00000000
S10	6	79.59500000	13.75499582	77.50000000	65.00000000	100.00000000
S11	6	82.85000000	15.48333039	86.66499329	61.66000000	100.00000000
S12	6	82.97166667	3.78590236	84.91999817	76.66000000	86.33000000
S13	6	89.51833333	12.63381244	92.72499084	68.66000000	100.00000000
S14	6	74.82166667	9.99317450	73.63499451	65.00000000	90.00000000
S15	6	69.26500000	12.75870487	75.00000000	48.66000000	80.00000000
S16	6	86.10833333	11.77225283	86.66499329	65.66000000	100.00000000
S17	6	85.07333333	10.62934366	82.50000000	73.33000000	100.00000000
S18	6	87.17000000	11.77413946	90.67999268	70.00000000	100.00000000
S19	6	86.89166667	12.93231365	88.17999268	66.66000000	100.00000000
S20	6	83.88666667	12.63545910	83.32998657	65.00000000	100.00000000
S21	6	77.37166667	11.05543019	74.99497986	63.33000000	90.91000000
S22	6	83.40666667	7.74099132	82.50000000	75.00000000	95.45000000
S23	6	85.27666667	9.96713132	84.16499329	75.00000000	100.00000000
S24	6	80.42833333	16.65702785	85.82998657	60.00000000	100.00000000
S25	6	89.24000000	5.02600438	90.00000000	83.33000000	95.45000000
AV	6	84.32166667	7.49499678	85.39498901	73.99000000	91.75000000

SPEARMAN RANK CORR. FACTORS 15:18 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S1	1.00000 0.0000	0.23191 0.6584	0.64684 0.1651	0.64706 0.1649	0.60294 0.2052	0.54412 0.2544	0.66176 0.1523	0.72471 0.1032	0.40584 0.4247	0.98561 0.0003	0.98561 0.0003	0.54412 0.2644
S2	0.23191 0.6584	1.00000 0.0000	0.33395 0.5177	0.31887 0.5379	0.81168 0.0499	0.63775 0.1731	0.86966 0.0244	0.42857 0.3965	0.25714 0.6228	0.08571 0.8717	0.08571 0.8717	0.05798 0.9131
S3	0.64684 0.1651	0.33395 0.5177	1.00000 0.0000	-0.09241 0.8618	0.33882 0.5112	0.30802 0.5526	0.52363 0.2863	0.57682 0.2307	0.81969 0.0456	0.63754 0.1733	0.63754 0.1733	0.95486 0.0030
S4	0.64706 0.1649	0.31887 0.5379	-0.09241 0.8618	1.00000 0.0000	0.72059 0.1062	0.61765 0.1913	0.58824 0.2194	0.43483 0.3889	-0.23191 0.6584	0.57977 0.2278	0.57977 0.2278	-0.27941 0.5918
S5	0.60294 0.2052	0.81168 0.0499	0.33882 0.5112	0.72059 0.1062	1.00000 0.0000	0.88235 0.0199	0.88235 0.0199	0.57977 0.2278	0.23191 0.6584	0.46382 0.3542	0.46382 0.3542	0.05882 0.9119
S6	0.54412 0.2644	0.63775 0.1731	0.30802 0.5526	0.61765 0.1913	0.88235 0.0199	1.00000 0.0000	0.69118 0.1283	0.75370 0.0835	0.46382 0.3542	0.40584 0.4247	0.40584 0.4247	0.08824 0.8680
S7	0.66175 0.1523	0.86966 0.0244	0.52363 0.2863	0.58824 0.2194	0.88235 0.0199	0.69118 0.1283	1.00000 0.0000	0.66674 0.1481	0.31887 0.5379	0.55078 0.2574	0.55078 0.2574	0.26471 0.6122
S8	0.72471 0.1032	0.42857 0.3965	0.57682 0.2307	0.43483 0.3889	0.57977 0.2278	0.75370 0.0835	0.66674 0.1481	1.00000 0.0000	0.71429 0.1108	0.65714 0.1562	0.65714 0.1562	0.46382 0.3542
S9	0.40584 0.4247	0.25714 0.6228	0.81969 0.0456	-0.23191 0.6584	0.23191 0.6584	0.46382 0.3542	0.31887 0.5379	0.71429 0.1108	1.00000 0.0000	0.37143 0.4685	0.37143 0.4685	0.81168 0.0499
S10	0.98561 0.0003	0.08571 0.8717	0.63754 0.1733	0.57977 0.2278	0.46382 0.3542	0.40584 0.4247	0.55078 0.2574	0.65714 0.1562	0.37143 0.4685	1.00000 0.0000	1.00000 0.0000	0.57977 0.2278
S11	0.98561 0.0003	0.08571 0.8717	0.63754 0.1733	0.57977 0.2278	0.46382 0.3542	0.40584 0.4247	0.55078 0.2574	0.65714 0.1562	0.37143 0.4685	1.00000 0.0000	1.00000 0.0000	0.57977 0.2278
S12	0.54412 0.2644	0.05798 0.9131	0.95486 0.0030	-0.27941 0.5918	0.05882 0.9119	0.08824 0.8680	0.26471 0.6122	0.46382 0.3542	0.81168 0.0499	0.57977 0.2278	0.57977 0.2278	1.00000 0.0000
S13	0.77941 0.0676	-0.02899 0.9565	0.83166 0.0401	0.07353 0.8899	0.10294 0.8461	0.04412 0.9339	0.36765 0.4734	0.52179 0.2883	0.55078 0.2574	0.84067 0.0361	0.84067 0.0361	0.86765 0.0251
S14	0.57353 0.2340	0.23191 0.6584	-0.06160 0.9077	0.88236 0.0199	0.67647 0.1401	0.47059 0.3462	0.45588 0.3635	0.11595 0.8268	-0.34786 0.4993	0.52179 0.2883	0.52179 0.2883	-0.23529 0.6536
S15	-0.01471 0.9779	0.02899 0.9565	-0.03080 0.9538	-0.07353 0.8899	-0.27941 0.5918	-0.30882 0.5515	0.13235 0.8026	0.23191 0.6584	-0.02899 0.9565	0.02899 0.9565	0.02899 0.9565	0.01471 0.9779
S16	0.72471 0.1032	0.54256 0.2657	0.39466 0.4387	0.63775 0.1731	0.63775 0.1731	0.63775 0.1731	0.81168 0.0499	0.88571 0.0188	0.37143 0.4685	0.65714 0.1562	0.65714 0.1562	0.23191 0.6584
S17	0.40584 0.4247	0.82857 0.0416	0.27323 0.6004	0.52179 0.2883	0.84067 0.0361	0.89865 0.0149	0.81168 0.0499	0.77143 0.0724	0.42857 0.3965	0.25714 0.6228	0.25714 0.6228	0.02899 0.9565

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S18	0.60294 0.2052	0.37685 0.4615	0.89326 0.0165	0.01471 0.9779	0.51471 0.2961	0.57353 0.2340	0.48529 0.3292	0.57977 0.2278	0.84067 0.0361	0.55078 0.2574	0.55078 0.2574	0.80882 0.0513
S19	0.39706 0.4357	0.92763 0.0077	0.58524 0.2224	0.22059 0.6745	0.70588 0.1170	0.50000 0.3125	0.91176 0.0113	0.52179 0.2883	0.40584 0.4247	0.28989 0.5774	0.28989 0.5774	0.35294 0.4926
S20	0.49281 0.3206	0.65714 0.1562	0.15179 0.7741	0.66674 0.1481	0.75370 0.0835	0.84067 0.0361	0.75370 0.0835	0.82857 0.0416	0.31429 0.5441	0.37143 0.4685	0.37143 0.4685	-0.05798 0.9131
S21	0.02899 0.9565	-0.08571 0.8717	-0.15179 0.7741	0.17393 0.7417	0.14494 0.7841	0.57977 0.2278	-0.11595 0.8268	0.48571 0.3287	0.37143 0.4685	-0.02857 0.9572	-0.02857 0.9572	-0.14494 0.7841
S22	-0.34786 0.4993	-0.25714 0.6228	-0.75897 0.0801	0.23191 0.6584	-0.14494 0.7841	0.14494 0.7841	-0.34786 0.4993	0.02857 0.9572	-0.31429 0.5441	-0.37143 0.4685	-0.37143 0.4685	-0.72471 0.1032
S23	-0.10294 0.8461	-0.69573 0.1248	-0.27722 0.5948	-0.16176 0.7595	-0.64706 0.1649	-0.35294 0.4926	-0.52941 0.2801	0.11595 0.8268	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	-0.05882 0.9119
S24	0.97059 0.0013	0.14494 0.7841	0.67765 0.1391	0.52941 0.2801	0.44118 0.3812	0.36765 0.4734	0.60294 0.2052	0.69573 0.1248	0.40584 0.4247	0.98561 0.0003	0.98561 0.0003	0.61765 0.1913
S25	0.62694 0.1825	0.52964 0.2798	0.18759 0.7219	0.71650 0.1092	0.61201 0.1966	0.56723 0.2404	0.77621 0.0695	0.76504 0.0763	0.14712 0.7809	0.55907 0.2488	0.55907 0.2488	0.01493 0.9776
AV	0.86965 0.0244	0.37143 0.4685	0.57682 0.2307	0.57977 0.2278	0.57977 0.2278	0.63775 0.1731	0.72471 0.1032	0.94286 0.0048	0.54286 0.2657	0.82857 0.0416	0.82857 0.0416	0.46382 0.3542

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S1	0.77941 0.0675	0.57353 0.2340	-0.01471 0.9779	0.72471 0.1032	0.40584 0.4247	0.60294 0.2052	0.39706 0.4357	0.49281 0.3208	0.02899 0.9565	-0.34786 0.4993	-0.10294 0.8461	0.97059 0.0013
S2	-0.02899 0.9565	0.23191 0.6584	0.02899 0.9565	0.54286 0.2657	0.82857 0.0416	0.37685 0.4615	0.92763 0.0077	0.65714 0.1562	-0.08571 0.8717	-0.25714 0.6228	-0.69573 0.1248	0.14494 0.7841
S3	0.83165 0.0401	-0.06160 0.9077	-0.03080 0.9538	0.39466 0.4387	0.27323 0.6004	0.89326 0.0165	0.58524 0.2224	0.15179 0.7741	-0.15179 0.7741	-0.75897 0.0801	-0.27722 0.5948	0.67765 0.1391
S4	0.07353 0.8899	0.98235 0.0199	-0.07353 0.8899	0.63775 0.1731	0.52179 0.2883	0.01471 0.9779	0.22059 0.6745	0.66674 0.1481	0.17393 0.7417	0.23191 0.6584	-0.16176 0.7595	0.52941 0.2801
S5	0.10294 0.8461	0.67647 0.1401	-0.27941 0.5918	0.63775 0.1731	0.84067 0.0361	0.51471 0.2961	0.70588 0.1170	0.75370 0.0835	0.14494 0.7841	-0.14494 0.7841	-0.64706 0.1649	0.44118 0.3812
S6	0.04412 0.9339	0.47059 0.3452	-0.30882 0.5515	0.63775 0.1731	0.89865 0.0149	0.57353 0.2340	0.50000 0.3125	0.84067 0.0361	0.57977 0.2278	0.14494 0.7841	-0.35294 0.4926	0.36765 0.4734
S7	0.36765 0.4734	0.45588 0.3635	0.13235 0.8026	0.81168 0.0499	0.81168 0.0499	0.48529 0.3292	0.91176 0.0113	0.75370 0.0835	-0.11595 0.8268	-0.34786 0.4993	-0.52941 0.2801	0.60294 0.2052
S8	0.52179 0.2883	0.11595 0.8268	0.23191 0.6584	0.88571 0.0188	0.77143 0.0724	0.57977 0.2278	0.52179 0.2883	0.82857 0.0416	0.48571 0.3287	0.02857 0.9572	0.11595 0.8268	0.69573 0.1248

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S9	0.55079 0.2574	-0.34786 0.4993	-0.02899 0.9565	0.37143 0.4685	0.42857 0.3965	0.84067 0.0361	0.40584 0.4247	0.31429 0.5441	0.37143 0.4685	-0.31429 0.5441	0.00000 1.0000	0.40584 0.4247
S10	0.84067 0.0361	0.52179 0.2883	0.02899 0.9565	0.65714 0.1562	0.25714 0.6228	0.55078 0.2574	0.28989 0.5774	0.37143 0.4685	-0.02857 0.9572	-0.37143 0.4685	0.00000 1.0000	0.98561 0.0003
S11	0.84067 0.0361	0.52179 0.2883	0.02899 0.9565	0.65714 0.1562	0.25714 0.6228	0.55078 0.2574	0.28989 0.5774	0.37143 0.4685	-0.02857 0.9572	-0.37143 0.4685	0.00000 1.0000	0.98561 0.0003
S12	0.86765 0.0251	-0.23529 0.6536	0.01471 0.9779	0.23191 0.6584	0.02899 0.9565	0.80882 0.0513	0.35294 0.4926	-0.05798 0.9131	-0.14494 0.7841	-0.72471 0.1032	-0.05882 0.9119	0.61765 0.1913
S13	1.00000 0.0000	0.04412 0.9339	0.23529 0.6536	0.46382 0.3542	0.00000 1.0000	0.58824 0.2194	0.30882 0.5515	0.05798 0.9131	-0.26090 0.6175	-0.63775 0.1731	0.10294 0.8461	0.88235 0.0199
S14	0.04412 0.9339	1.00000 0.0000	-0.42647 0.3991	0.28989 0.5774	0.26090 0.6175	0.10294 0.8461	0.11765 0.8243	0.31887 0.5379	-0.05798 0.9131	-0.02899 0.9565	-0.44118 0.3812	0.42647 0.3991
S15	0.23529 0.6536	-0.42647 0.3991	1.00000 0.0000	0.46382 0.3542	0.05798 0.9131	-0.41176 0.4173	0.22059 0.6745	0.23191 0.6584	-0.20292 0.6998	0.11595 0.8268	0.54412 0.2644	0.17647 0.7380
S16	0.46382 0.3542	0.28989 0.5774	0.46382 0.3542	1.00000 0.0000	0.77143 0.0724	0.28989 0.5774	0.63775 0.1731	0.88571 0.0188	0.20000 0.7040	0.02857 0.9572	0.05798 0.9131	0.72471 0.1032
S17	0.00000 1.0000	0.26090 0.6175	0.05798 0.9131	0.77143 0.0724	1.00000 0.0000	0.40584 0.4247	0.72471 0.1032	0.94288 0.0048	0.42857 0.3965	0.14286 0.7872	-0.31887 0.5379	0.28989 0.5774
S18	0.58824 0.2194	0.10294 0.8451	-0.41176 0.4173	0.28989 0.5774	0.40584 0.4247	1.00000 0.0000	0.48529 0.3292	0.23191 0.6584	0.14494 0.7841	-0.57977 0.2278	-0.42647 0.3991	0.52941 0.2801
S19	0.30882 0.5515	0.11765 0.8243	0.22059 0.6745	0.63775 0.1731	0.72471 0.1032	0.48529 0.3292	1.00000 0.0000	0.57977 0.2278	-0.26090 0.6175	-0.49281 0.3206	-0.58824 0.2194	0.38235 0.4544
S20	0.05798 0.9131	0.31887 0.5379	0.23191 0.6584	0.88571 0.0188	0.94286 0.0048	0.23191 0.6584	0.57977 0.2278	1.00000 0.0000	0.48571 0.3267	0.31429 0.5441	-0.05798 0.9131	0.40584 0.4247
S21	-0.26090 0.6175	-0.05798 0.9131	-0.20292 0.6998	0.20000 0.7040	0.42857 0.3965	0.14494 0.7841	-0.26090 0.6175	0.48571 0.3267	1.00000 0.0000	0.71429 0.1108	0.37685 0.4615	-0.08697 0.8699
S22	-0.63775 0.1731	-0.02899 0.9565	0.11595 0.8268	0.02857 0.9572	0.14286 0.7872	-0.57977 0.2278	-0.49281 0.3206	0.31429 0.5441	0.71429 0.1108	1.00000 0.0000	0.55078 0.2574	-0.40584 0.4247
S23	0.10294 0.8461	-0.44118 0.3812	0.54412 0.2644	0.05798 0.9131	-0.31887 0.5379	-0.42647 0.3991	-0.58824 0.2194	-0.05798 0.9131	0.37685 0.4615	0.55078 0.2574	1.00000 0.0000	0.02941 0.9559
S24	0.88235 0.0199	0.42647 0.3991	0.17647 0.7380	0.72471 0.1032	0.28989 0.5774	0.52941 0.2801	0.38235 0.4544	0.40584 0.4247	-0.08697 0.8699	-0.40584 0.4247	0.02941 0.9559	1.00000 0.0000
S25	0.31347 0.5452	0.35825 0.4856	0.52245 0.2876	0.97101 0.0012	0.73561 0.0956	0.07464 0.8883	0.58215 0.2254	0.88273 0.0198	0.14712 0.7809	0.14712 0.7809	0.07464 0.8883	0.62694 0.1828
AV	0.66674 0.1481	0.28989 0.5774	0.31887 0.5379	0.94286 0.0048	0.65714 0.1562	0.49271 0.3206	0.52179 0.2883	0.77143 0.0724	0.25714 0.6228	-0.08571 0.8717	0.11595 0.8268	0.86966 0.0244

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 5

	S25	AV
S1	0.62694	0.86966
	0.1828	0.0244
S2	0.52964	0.37143
	0.2798	0.4685
S3	0.18759	0.57682
	0.7219	0.2307
S4	0.71650	0.57977
	0.1092	0.2278
S5	0.61201	0.57977
	0.1965	0.2278
S6	0.56723	0.63775
	0.2404	0.1731
S7	0.77621	0.72471
	0.0695	0.1032
S8	0.76504	0.94286
	0.0763	0.0048
S9	0.14712	0.54286
	0.7809	0.2657
S10	0.55907	0.82857
	0.2488	0.0416
S11	0.55907	0.82857
	0.2488	0.0416
S12	0.01493	0.46382
	0.9776	0.3542
S13	0.31347	0.66674
	0.5452	0.1481
S14	0.35925	0.28989
	0.4855	0.5774
S15	0.52245	0.31887
	0.2676	0.5379
S16	0.97101	0.94286
	0.0012	0.0048
S17	0.73561	0.65714
	0.0956	0.1562

SPEARMAN RANK CORR. FACTORS 15:19 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S25	AV
S18	0.07464 0.8883	0.49281 0.3206
S19	0.58215 0.2254	0.52179 0.2883
S20	0.88273 0.0199	0.77143 0.0724
S21	0.14712 0.7809	0.25714 0.6228
S22	0.14712 0.7809	-0.08571 0.8717
S23	0.07464 0.8883	0.11595 0.8268
S24	0.62694 0.1829	0.86966 0.0244
S25	1.00000 0.0000	0.85331 0.0307
AV	0.85331 0.0307	1.00000 0.0000

11.3. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Three

DATA 15:21 TUESDAY, SEPTEMBER 13, 1983

OBS	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
1	100.00	85.00	90.00	80.00	90.00	100.00	100.00	100.00	95.00	100.00	90.00	90.00	80.00
2	90.00	90.00	100.00	90.00	85.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	90.00
3	65.00	80.00	85.00	75.00	85.00	85.00	85.00	85.00	90.00	90.00	75.00	90.00	85.00
4	80.00	78.33	65.00	65.00	70.00	83.33	90.00	80.00	90.00	91.66	75.00	75.00	90.00
5	66.66	81.66	76.66	80.00	76.66	66.66	66.66	76.66	76.66	76.66	66.66	66.66	76.66
6	86.36	90.91	77.27	81.81	77.27	90.91	77.27	90.91	95.45	95.45	77.27	68.18	95.45

OBS	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	AV
1	90.00	85.00	90.00	75.00	100.00	100.00	90.00	85.00	85.00	81.66	100.00	95.00	91.0660
2	80.00	70.00	78.33	90.00	80.00	95.00	100.00	100.00	90.00	80.00	95.00	100.00	91.9332
3	85.00	90.00	85.00	66.33	80.00	80.00	90.00	90.00	100.00	80.00	95.00	95.00	83.7330
4	70.00	76.66	63.33	68.33	60.00	75.00	78.33	80.00	90.00	80.00	90.00	100.00	78.6000
5	76.66	73.33	76.66	80.00	76.66	68.66	76.66	66.66	80.00	76.66	100.00	91.66	75.8600
6	77.27	95.45	95.45	95.45	86.36	90.91	86.36	86.36	95.45	95.45	95.45	95.45	87.9970

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	6	81.33666667	13.65785586	83.17999268	65.00000000	100.00000000
S2	6	84.31666667	5.24920819	83.32998657	78.33000000	90.91000000
S3	6	82.32166667	12.13480682	81.13499451	65.00000000	100.00000000
S4	6	78.63500000	8.27159900	80.00000000	65.00000000	90.00000000
S5	6	80.65500000	7.29430394	81.13499451	70.00000000	90.00000000
S6	6	87.65000000	12.50549959	87.95498657	65.66000000	100.00000000
S7	6	86.48833333	13.09822647	87.50000000	66.66000000	100.00000000
S8	6	87.92833333	8.97811654	87.95498657	75.66000000	100.00000000
S9	6	91.18500000	8.05273556	92.50000000	75.66000000	100.00000000
S10	6	92.29500000	8.70415476	93.55499268	76.66000000	100.00000000
S11	6	80.65500000	12.10648050	76.13499451	66.66000000	100.00000000
S12	6	81.64000000	13.61271758	82.50000000	66.66000000	100.00000000
S13	6	86.18500000	7.00475196	87.50000000	76.66000000	95.45000000
S14	6	79.82166667	6.97735886	78.63499451	70.00000000	90.00000000
S15	6	81.74000000	10.01180703	80.82998657	70.00000000	95.45000000
S16	6	81.46166667	11.33769891	81.66499329	63.33000000	95.45000000
S17	6	79.51833333	11.26666129	77.50000000	68.33000000	95.45000000
S18	6	80.50333333	13.03905774	80.00000000	60.00000000	100.00000000
S19	6	81.26166667	16.35501687	82.95498657	60.00000000	100.00000000
S20	6	86.89166667	8.59562311	88.17999268	76.66000000	100.00000000
S21	6	84.67000000	11.06843982	85.67999268	65.66000000	100.00000000
S22	6	90.07500000	7.13678949	90.00000000	80.00000000	100.00000000
S23	6	82.29500000	6.64848178	80.00000000	75.66000000	95.45000000
S24	6	95.90833333	3.74838854	95.22499084	90.00000000	100.00000000
S25	6	96.18500000	3.25369790	95.22499084	91.66000000	100.00000000
AV	6	84.86486667	6.63088154	85.86499023	75.86000000	91.93200000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S1	1.00000 0.0000	0.60000 0.2080	0.54286 0.2657	0.55078 0.2574	0.49281 0.3206	0.81168 0.0499	0.69573 0.1248	0.82857 0.0416	0.72471 0.1032	0.92763 0.0077	0.84067 0.0361	0.40584 0.4247
S2	0.60000 0.2080	1.00000 0.0000	0.54286 0.2657	0.92763 0.0077	0.40584 0.4247	0.63775 0.1731	0.05798 0.9131	0.60000 0.2080	0.75370 0.0835	0.57977 0.2278	0.63775 0.1731	0.08697 0.8699
S3	0.54286 0.2657	0.54286 0.2657	1.00000 0.0000	0.63775 0.1731	0.89865 0.0149	0.86966 0.0244	0.63775 0.1731	0.82857 0.0416	0.69573 0.1248	0.69573 0.1248	0.81168 0.0499	0.81168 0.0499
S4	0.55078 0.2574	0.92763 0.0077	0.63775 0.1731	1.00000 0.0000	0.38235 0.4544	0.60294 0.2052	0.13235 0.8026	0.52179 0.2883	0.73529 0.0958	0.54412 0.2644	0.64706 0.1649	0.22059 0.6745
S5	0.49281 0.3206	0.40584 0.4247	0.89865 0.0149	0.38235 0.4544	1.00000 0.0000	0.80882 0.0513	0.57353 0.2340	0.84067 0.0361	0.48529 0.3292	0.60294 0.2052	0.66176 0.1523	0.69118 0.1283
S6	0.81168 0.0499	0.63775 0.1731	0.86966 0.0244	0.60294 0.2052	0.80882 0.0513	1.00000 0.0000	0.76471 0.0765	0.98561 0.0003	0.88235 0.0199	0.94118 0.0051	0.97059 0.0013	0.75000 0.0859
S7	0.69573 0.1248	0.05798 0.9131	0.63775 0.1731	0.13235 0.8026	0.57353 0.2340	0.76471 0.0765	1.00000 0.0000	0.75370 0.0835	0.58824 0.2194	0.82353 0.0440	0.79412 0.0592	0.86765 0.0251
S8	0.82857 0.0416	0.60000 0.2080	0.82857 0.0416	0.52179 0.2883	0.84067 0.0361	0.98561 0.0003	0.75370 0.0835	1.00000 0.0000	0.81168 0.0499	0.92763 0.0077	0.92763 0.0077	0.69573 0.1248
S9	0.72471 0.1032	0.75370 0.0835	0.69573 0.1248	0.73529 0.0958	0.48529 0.3292	0.88235 0.0199	0.58824 0.2194	0.81168 0.0499	1.00000 0.0000	0.88235 0.0199	0.94118 0.0051	0.60294 0.2052
S10	0.92763 0.0077	0.57977 0.2278	0.69573 0.1248	0.54412 0.2644	0.60294 0.2052	0.94118 0.0051	0.82353 0.0440	0.92763 0.0077	0.88235 0.0199	1.00000 0.0000	0.97059 0.0013	0.66176 0.1523
S11	0.84067 0.0361	0.63775 0.1731	0.81168 0.0499	0.64706 0.1649	0.86176 0.1523	0.97059 0.0013	0.79412 0.0592	0.92763 0.0077	0.94118 0.0051	0.97059 0.0013	1.00000 0.0000	0.75000 0.0859
S12	0.40584 0.4247	0.08697 0.8699	0.81168 0.0499	0.22059 0.6745	0.69118 0.1283	0.75000 0.0859	0.86765 0.0251	0.69573 0.1248	0.60294 0.2052	0.66176 0.1523	0.75000 0.0859	1.00000 0.0000
S13	0.20292 0.6998	0.37685 0.4615	0.00000 1.0000	0.26471 0.6122	-0.19118 0.7167	0.30882 0.5515	0.13235 0.8026	0.23191 0.6584	0.66176 0.1523	0.39706 0.4357	0.42647 0.3991	0.14706 0.7810
S14	0.37143 0.4685	0.31429 0.5441	0.82857 0.0416	0.26090 0.6175	0.98561 0.0003	0.72471 0.1032	0.49281 0.3206	0.77143 0.0724	0.37685 0.4615	0.49281 0.3206	0.55078 0.2574	0.63775 0.1731
S15	-0.14285 0.7872	0.14286 0.7872	-0.14286 0.7872	-0.20292 0.6998	0.14494 0.7841	0.05798 0.9131	-0.28989 0.5774	0.14286 0.7872	0.02899 0.9565	-0.05798 0.9131	-0.08697 0.8699	-0.23191 0.6584
S16	0.37143 0.4685	0.71429 0.1108	0.48571 0.3287	0.46382 0.3542	0.63775 0.1731	0.60876 0.1997	0.02899 0.9565	0.65714 0.1562	0.52179 0.2883	0.43483 0.3889	0.46382 0.3542	0.11595 0.8268
S17	0.43483 0.3889	0.92763 0.0077	0.28989 0.5774	0.91176 0.0113	0.07353 0.8899	0.35294 0.4926	-0.17647 0.7380	0.28989 0.5774	0.58824 0.2194	0.35294 0.4926	0.41176 0.4173	-0.16176 0.7595

SPEARMAN RANK CORR. FACTORS 15:21 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S18	0.60876 0.1997	0.69573 0.1248	0.66674 0.1481	0.50000 0.3125	0.82353 0.0440	0.77941 0.0676	0.30882 0.5515	0.84067 0.0361	0.57353 0.2340	0.63235 0.1779	0.63235 0.1779	0.30882 0.5516
S19	1.00000 0.0000	0.60000 0.2080	0.54286 0.2657	0.55078 0.2574	0.49281 0.3206	0.81168 0.0499	0.69573 0.1248	0.82857 0.0416	0.72471 0.1032	0.92763 0.0077	0.84067 0.0361	0.40584 0.4247
S20	0.46382 0.3542	0.37685 0.4615	0.92763 0.0077	0.45588 0.3635	0.80882 0.0513	0.86765 0.0251	0.75000 0.0859	0.81168 0.0499	0.75000 0.0859	0.72059 0.1062	0.83824 0.0371	0.94118 0.0051
S21	0.20000 0.7040	0.42857 0.3965	0.77143 0.0724	0.49281 0.3206	0.57977 0.2278	0.69573 0.1248	0.46382 0.3542	0.60000 0.2080	0.75370 0.0835	0.52179 0.2863	0.69573 0.1248	0.78269 0.0657
S22	-0.31887 0.5379	0.02899 0.9565	0.11595 0.8268	-0.08824 0.8680	0.10294 0.8461	0.16176 0.7595	-0.01471 0.9779	0.11595 0.8268	0.30882 0.5515	0.01471 0.9779	0.13235 0.8026	0.29412 0.5715
S23	0.57682 0.2307	0.57682 0.2307	0.27323 0.6004	0.27722 0.5948	0.40043 0.4315	0.64684 0.1651	0.27722 0.5948	0.69825 0.1228	0.64684 0.1651	0.64684 0.1651	0.58524 0.2224	0.15401 0.7708
S24	0.26482 0.6121	0.44137 0.3809	0.17655 0.7379	0.35825 0.4856	0.35825 0.4856	0.08956 0.8660	-0.26869 0.6067	0.17655 0.7379	-0.13434 0.7997	0.00000 1.0000	-0.04478 0.9329	-0.35825 0.4856
S25	0.35309 0.4924	0.08827 0.8679	0.08827 0.8679	0.13434 0.7997	-0.17912 0.7342	0.35825 0.4856	0.53737 0.2715	0.26482 0.6121	0.62694 0.1828	0.53737 0.2715	0.53737 0.2715	0.44781 0.3732
AV	0.77143 0.0724	0.65714 0.1562	0.88571 0.0188	0.66674 0.1481	0.75370 0.0835	0.98561 0.0003	0.75370 0.0835	0.94286 0.0048	0.92763 0.0077	0.92763 0.0077	0.98561 0.0003	0.78269 0.0657

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S1	0.20292 0.6998	0.37143 0.4685	-0.14286 0.7872	0.37143 0.4685	0.43483 0.3889	0.60876 0.1997	1.00000 0.0000	0.46382 0.3542	0.20000 0.7040	-0.31887 0.5379	0.57682 0.2307	0.26482 0.6121
S2	0.37685 0.4615	0.31429 0.5441	0.14286 0.7872	0.71429 0.1108	0.92763 0.0077	0.69573 0.1248	0.60000 0.2080	0.37685 0.4615	0.42857 0.3965	0.02899 0.9565	0.57682 0.2307	0.44137 0.3809
S3	0.00000 1.0000	0.82857 0.0416	-0.14286 0.7872	0.49571 0.3287	0.28989 0.5774	0.66674 0.1481	0.54286 0.2657	0.92763 0.0077	0.77143 0.0724	0.11595 0.8268	0.27323 0.6004	0.17655 0.7379
S4	0.26471 0.6122	0.26090 0.6175	-0.20292 0.6998	0.46382 0.3542	0.91176 0.0113	0.50000 0.3125	0.55078 0.2574	0.45588 0.3635	0.49281 0.3206	-0.08824 0.8680	0.27722 0.5948	0.35825 0.4856
S5	-0.19118 0.7167	0.98561 0.0003	0.14494 0.7841	0.63775 0.1731	0.87353 0.0899	0.82353 0.0440	0.49281 0.3206	0.80882 0.0513	0.57977 0.2278	0.10294 0.8461	0.40043 0.4315	0.35825 0.4856
S6	0.30882 0.5515	0.72471 0.1032	0.05798 0.9131	0.60876 0.1997	0.35294 0.4926	0.77941 0.0676	0.81168 0.0499	0.86765 0.0251	0.69573 0.1248	0.16176 0.7595	0.64684 0.1651	0.08956 0.8660
S7	0.13235 0.8026	0.49281 0.3206	-0.28989 0.5774	0.02899 0.9565	-0.17647 0.7380	0.30882 0.5515	0.69573 0.1248	0.75000 0.0859	0.46382 0.3542	-0.01471 0.9779	0.27722 0.5948	-0.26869 0.6067
S8	0.23191 0.6584	0.77143 0.0724	0.14286 0.7872	0.65714 0.1562	0.28989 0.5774	0.84067 0.0361	0.82857 0.0416	0.81168 0.0499	0.60000 0.2080	0.11595 0.8268	0.69825 0.1228	0.17655 0.7379

SPEARMAN RANK CORR. FACTORS 15:21 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S9	0.66176 0.1523	0.37685 0.4615	0.02899 0.9568	0.52179 0.2883	0.58824 0.2194	0.57353 0.2340	0.72471 0.1032	0.75000 0.0859	0.75370 0.0835	0.30882 0.5515	0.64684 0.1651	-0.13434 0.7997
S10	0.39705 0.4357	0.49281 0.3206	-0.05798 0.9131	0.43483 0.3889	0.35294 0.4926	0.63235 0.1779	0.92763 0.0077	0.72059 0.1062	0.52179 0.2883	0.01471 0.9779	0.64684 0.1651	0.00000 1.0000
S11	0.42647 0.3991	0.55078 0.2574	-0.08697 0.8699	0.46382 0.3542	0.41176 0.4173	0.63235 0.1779	0.84067 0.0361	0.83824 0.0371	0.69573 0.1248	0.13235 0.8026	0.58524 0.2224	-0.04478 0.9329
S12	0.14705 0.7813	0.63775 0.1731	-0.23191 0.6584	0.11595 0.8268	-0.16176 0.7595	0.30882 0.5515	0.40584 0.4247	0.94118 0.0051	0.78269 0.0657	0.29412 0.5715	0.15401 0.7708	-0.35825 0.4856
S13	1.00000 0.0000	-0.23191 0.6584	0.31887 0.5379	0.26090 0.6175	0.36765 0.4734	0.07353 0.8899	0.20292 0.6998	0.23529 0.6536	0.49281 0.3206	0.64706 0.1649	0.58524 0.2224	-0.58215 0.2254
S14	-0.23191 0.6584	1.00000 0.0000	0.25714 0.6228	0.65714 0.1562	-0.02899 0.9565	0.81168 0.0499	0.37143 0.4685	0.75370 0.0835	0.54286 0.2657	0.17393 0.7417	0.39466 0.4387	0.35309 0.4924
S15	0.31887 0.5379	0.25714 0.6228	1.00000 0.0000	0.71429 0.1108	-0.02899 0.9565	0.49281 0.3206	-0.14286 0.7872	-0.05798 0.9131	0.08571 0.8717	0.60876 0.1997	0.59625 0.1228	0.08827 0.8679
S16	0.26090 0.6175	0.65714 0.1562	0.71429 0.1108	1.00000 0.0000	0.46382 0.3542	0.92763 0.0077	0.37143 0.4685	0.40584 0.4247	0.42857 0.3965	0.37685 0.4615	0.81969 0.0456	0.44137 0.3809
S17	0.36765 0.4734	-0.02899 0.9565	-0.02899 0.9565	0.46382 0.3542	1.00000 0.0000	0.39706 0.4357	0.43483 0.3889	0.10294 0.8461	0.23191 0.6584	-0.10294 0.8461	0.33882 0.5112	0.40303 0.4282
S18	0.07353 0.8899	0.81169 0.0499	0.49281 0.3206	0.92763 0.0077	0.39706 0.4357	1.00000 0.0000	0.60876 0.1997	0.54412 0.2644	0.40584 0.4247	0.13235 0.8026	0.77005 0.0732	0.53737 0.2715
S19	0.20292 0.6998	0.37143 0.4685	-0.14286 0.7872	0.37143 0.4685	0.43483 0.3889	0.60876 0.1997	1.00000 0.0000	0.46382 0.3542	0.20000 0.7040	-0.31887 0.5379	0.57682 0.2307	0.26482 0.6121
S20	0.23529 0.6536	0.75370 0.0835	-0.05798 0.9131	0.40584 0.4247	0.10294 0.8461	0.54412 0.2644	0.46382 0.3542	1.00000 0.0000	0.89865 0.0149	0.38235 0.4644	0.33882 0.5112	-0.17912 0.7342
S21	0.49281 0.3206	0.54286 0.2657	0.08571 0.8717	0.42857 0.3965	0.23191 0.6584	0.40584 0.4247	0.20000 0.7040	0.89865 0.0149	1.00000 0.0000	0.66674 0.1481	0.33395 0.5177	-0.35309 0.4924
S22	0.64706 0.1649	0.17393 0.7417	0.60876 0.1997	0.37685 0.4615	-0.10294 0.8461	0.13235 0.8026	-0.31887 0.5379	0.38235 0.4644	0.66674 0.1481	1.00000 0.0000	0.40043 0.4315	-0.58215 0.2254
S23	0.58524 0.2224	0.39466 0.4387	0.69825 0.1228	0.81969 0.0456	0.33882 0.5112	0.77005 0.0732	0.57682 0.2307	0.33882 0.5112	0.33395 0.5177	0.40043 0.4315	1.00000 0.0000	0.09380 0.8597
S24	-0.58215 0.2254	0.35309 0.4924	0.08827 0.8679	0.44137 0.3809	0.40303 0.4282	0.53737 0.2715	0.26482 0.6121	-0.17912 0.7342	-0.35309 0.4924	-0.58215 0.2254	0.09380 0.8597	1.00000 0.0000
S25	0.80605 0.0529	-0.26482 0.6121	-0.17655 0.7379	-0.17655 0.7379	0.08956 0.8660	-0.17912 0.7342	0.35309 0.4924	0.35825 0.4856	0.44137 0.3809	0.35825 0.4856	0.28139 0.5891	-0.77273 0.0716
AV	0.37685 0.4615	0.65714 0.1562	-0.02857 0.9572	0.54286 0.2657	0.40584 0.4247	0.69573 0.1248	0.77143 0.0724	0.89865 0.0149	0.77143 0.0724	0.20292 0.6998	0.57682 0.2307	0.00000 1.0000

SPEARMAN RANK CORR. FACTORS 15:21 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S25	AV
S1	0.35309	0.77143
	0.4924	0.0724
S2	0.08827	0.65714
	0.8679	0.1562
S3	0.08827	0.88571
	0.8679	0.0188
S4	0.13434	0.66674
	0.7997	0.1481
S5	-0.17912	0.76370
	0.7342	0.0835
S6	0.35825	0.98561
	0.4856	0.0003
S7	0.53737	0.75370
	0.2715	0.0835
S8	0.26482	0.94286
	0.6121	0.0048
S9	0.62694	0.92763
	0.1828	0.0077
S10	0.53737	0.92763
	0.2715	0.0077
S11	0.53737	0.98561
	0.2715	0.0003
S12	0.44781	0.78259
	0.3732	0.0657
S13	0.80606	0.37685
	0.0528	0.4615
S14	-0.26482	0.65714
	0.6121	0.1562
S15	-0.17655	-0.02857
	0.7379	0.9572
S16	-0.17655	0.54286
	0.7379	0.2657
S17	0.08956	0.40584
	0.8660	0.4247

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 6

	S25	AV
S18	-0.17912	0.69573
	0.7342	0.1246
S19	0.35309	0.77143
	0.4924	0.0724
S20	0.35825	0.89865
	0.4856	0.0149
S21	0.44137	0.77143
	0.3809	0.0724
S22	0.35825	0.20292
	0.4856	0.6998
S23	0.28139	0.57682
	0.5891	0.2307
S24	-0.77273	0.00000
	0.0716	1.0000
S25	1.00000	0.44137
	0.0000	0.3809
AV	0.44137	1.00000
	0.3809	0.0000

11.4. Spearman Rank Coefficients: Individual Cross-Sectional Rankings for Level Four

DATA 15:25 TUESDAY, SEPTEMBER 13, 1983

OBS	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
1	100.00	85.00	95.00	90.00	85.00	90.00	90.00	100.00	100.00	70.00	90.00	90.00	75.00
2	100.00	85.00	100.00	100.00	90.00	85.00	100.00	100.00	100.00	73.33	83.33	90.00	100.00
3	90.00	88.33	78.33	75.00	100.00	55.00	90.00	100.00	75.00	85.00	85.00	95.00	56.66
4	90.00	70.00	78.33	85.00	86.66	80.00	90.00	95.00	76.66	65.66	95.00	85.00	83.33
5	80.00	53.33	66.66	66.66	90.00	66.66	76.66	76.66	76.66	93.33	66.66	76.66	88.33
6	86.36	95.45	86.36	85.00	100.00	100.00	95.45	90.91	81.82	95.45	90.91	81.82	90.91

OBS	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	AV
1	80.00	90.00	70.00	80.00	90.00	90.00	100.00	100.00	80.00	70.00	80.00	95.00	87.4000
2	100.00	95.00	75.00	90.00	100.00	100.00	100.00	100.00	100.00	85.00	80.00	100.00	93.2660
3	95.00	80.00	91.66	80.00	85.00	95.00	70.00	85.00	95.00	70.00	70.00	95.00	83.8000
4	90.00	83.33	83.33	86.66	83.33	76.66	85.00	100.00	83.33	56.66	65.00	93.33	82.7308
5	76.66	93.33	75.00	65.00	66.66	66.66	83.33	85.00	63.33	61.66	76.66	96.66	75.5300
6	100.00	95.45	100.00	100.00	81.82	81.82	90.91	95.45	90.91	72.73	77.27	93.94	90.5000

VARIABLE	N	MEAN	STD DEV	MEDIAN	MINIMUM	MAXIMUM
S1	6	91.06000000	7.82953383	90.00000000	80.00000000	100.00000000
S2	6	79.51833333	15.28390188	85.00000000	53.33000000	95.45000000
S3	6	84.11333333	12.22674064	82.34498596	65.66000000	100.00000000
S4	6	83.61000000	11.61691009	85.00000000	65.66000000	100.00000000
S5	6	91.94333333	6.53446759	90.00000000	85.00000000	100.00000000
S6	6	79.44333333	16.28555393	82.50000000	55.00000000	100.00000000
S7	6	90.35166667	7.83474420	90.00000000	75.66000000	100.00000000
S8	6	93.76166667	9.15295453	97.50000000	75.66000000	100.00000000
S9	6	85.02333333	11.82556834	79.23999023	75.00000000	100.00000000
S10	6	80.62833333	12.34072189	79.16499329	66.66000000	95.45000000
S11	6	85.15000000	9.98937035	87.50000000	65.66000000	95.00000000
S12	6	86.41333333	6.59822602	87.50000000	75.66000000	95.00000000
S13	6	84.03833333	11.87107984	85.82998657	65.66000000	100.00000000
S14	6	90.27666667	10.02493225	92.50000000	76.66000000	100.00000000
S15	6	89.61833333	6.46356377	91.66499329	80.00000000	95.45000000
S16	6	82.49833333	11.48559518	79.16499329	70.00000000	100.00000000
S17	6	83.61000000	11.75723607	83.32998657	65.00000000	100.00000000
S18	6	84.46833333	10.93216249	84.16499329	66.66000000	100.00000000
S19	6	85.02333333	12.37756303	85.90998840	66.66000000	100.00000000
S20	6	88.20666667	11.41070316	87.95498657	70.00000000	100.00000000
S21	6	94.24166667	7.37227351	97.72499084	85.00000000	100.00000000
S22	6	85.42833333	13.08590909	87.11997986	63.33000000	100.00000000
S23	6	69.34166667	9.77101513	70.00000000	55.66000000	85.00000000
S24	6	74.82166667	6.04512503	76.96498108	65.00000000	80.00000000
S25	6	95.65500000	2.41221582	95.00000000	93.33000000	100.00000000
AV	6	85.53780000	6.30668775	85.59999084	75.53000000	93.26600000

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S1	1.00000 0.0000	0.14927 0.7778	0.80606 0.0528	0.85084 0.0317	-0.48485 0.3297	0.23540 0.6534	0.50024 0.3122	0.90669 0.0127	0.59091 0.2168	-0.67676 0.1398	0.11770 0.8243	0.74635 0.0883
S2	0.14927 0.7778	1.00000 0.0000	0.44118 0.3812	0.23529 0.6536	0.61201 0.1966	0.40584 0.4247	0.61604 0.1928	0.33882 0.5112	0.08956 0.8660	0.40564 0.4247	0.31887 0.5379	0.41176 0.4173
S3	0.80606 0.0528	0.44118 0.3812	1.00000 0.0000	0.95588 0.0029	-0.19405 0.7126	0.66674 0.1481	0.83166 0.0401	0.64684 0.1651	0.85084 0.0317	-0.23191 0.6584	0.11595 0.8268	0.44118 0.3812
S4	0.85084 0.0317	0.23529 0.6536	0.95588 0.0029	1.00000 0.0000	-0.40303 0.4282	0.63775 0.1731	0.77005 0.0732	0.61604 0.1928	0.85084 0.0317	-0.46382 0.3542	0.23191 0.6584	0.38235 0.4544
S5	-0.48485 0.3297	0.61201 0.1966	-0.19405 0.7126	-0.40303 0.4282	1.00000 0.0000	-0.17655 0.7379	0.25012 0.6326	-0.18759 0.7219	-0.45455 0.3651	0.79446 0.0590	-0.17655 0.7379	0.01493 0.9776
S6	0.23540 0.6534	0.40584 0.4247	0.66674 0.1481	0.63775 0.1731	-0.17655 0.7379	1.00000 0.0000	0.57682 0.2307	-0.03036 0.9545	0.79446 0.0590	0.08571 0.8717	0.42857 0.3965	-0.23191 0.6584
S7	0.50024 0.3122	0.61604 0.1928	0.83166 0.0401	0.77005 0.0732	0.25012 0.6326	0.57682 0.2307	1.00000 0.0000	0.41935 0.4078	0.56277 0.2450	0.03036 0.9545	0.21251 0.6860	0.30802 0.5526
S8	0.90669 0.0127	0.33882 0.5112	0.64684 0.1651	0.61604 0.1928	-0.18759 0.7219	-0.03036 0.9545	0.41935 0.4078	1.00000 0.0000	0.28139 0.5891	-0.51610 0.2946	0.03036 0.9545	0.95486 0.0030
S9	0.59091 0.2168	0.08956 0.8660	0.85084 0.0317	0.85084 0.0317	-0.45455 0.3651	0.79446 0.0590	0.56277 0.2450	0.28139 0.5891	1.00000 0.0000	-0.17655 0.7379	0.00000 1.0000	0.00000 1.0000
S10	-0.67676 0.1398	0.40584 0.4247	-0.23191 0.6584	-0.46382 0.3542	0.79446 0.0590	0.08571 0.8717	0.03036 0.9545	-0.51610 0.2946	-0.17655 0.7379	1.00000 0.0000	-0.37143 0.4605	-0.40584 0.4247
S11	0.11770 0.8243	0.31887 0.5379	0.11595 0.8268	0.23191 0.6584	-0.17655 0.7379	0.42857 0.3965	0.21251 0.6860	0.03036 0.9545	0.00000 1.0000	-0.37143 0.4605	1.00000 0.0000	0.02899 0.9565
S12	0.74635 0.0883	0.41176 0.4173	0.44118 0.3812	0.38235 0.4544	0.01493 0.9776	-0.23191 0.6584	0.30802 0.5526	0.95486 0.0030	0.00000 1.0000	-0.40584 0.4247	0.02899 0.9565	1.00000 0.0000
S13	-0.08827 0.8679	-0.02899 0.9565	0.37685 0.4615	0.37685 0.4615	0.14712 0.7809	0.48571 0.3287	0.57682 0.2307	-0.33395 0.5177	0.52964 0.2798	0.31429 0.5441	-0.20000 0.7040	-0.49281 0.3206
S14	0.25376 0.6275	0.75000 0.0859	0.58824 0.2194	0.48529 0.3292	0.56723 0.2404	0.37685 0.4615	0.92406 0.0084	0.30802 0.5526	0.22391 0.6698	0.23191 0.6584	0.23191 0.6584	0.30882 0.5515
S15	-0.17655 0.7379	0.20292 0.6998	0.40584 0.4247	0.31887 0.5379	0.20597 0.6954	0.71429 0.1108	0.51610 0.2946	-0.39456 0.4387	0.61791 0.1911	0.54286 0.2657	-0.14286 0.7872	-0.55078 0.2574
S16	-0.49259 0.3209	0.60294 0.2052	-0.26471 0.6122	-0.35294 0.4926	0.80606 0.0528	-0.02899 0.9565	0.24642 0.6379	-0.27722 0.5948	-0.53737 0.2715	0.49281 0.3206	0.40584 0.4247	-0.07353 0.8899
S17	0.20899 0.6911	0.60294 0.2052	0.60294 0.2052	0.58824 0.2194	0.28361 0.5860	0.66574 0.1481	0.89326 0.0165	0.09241 0.8618	0.40303 0.4282	0.08697 0.8699	0.52179 0.2883	0.01471 0.9779

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
S18	0.97101 0.0012	0.23191 0.6584	0.81168 0.0499	0.81168 0.0499	-0.29424 0.5714	0.14286 0.7872	0.57682 0.2307	0.94112 0.0051	0.52964 0.2798	-0.54286 0.2657	-0.02857 0.9572	0.81168 0.0499
S19	0.76504 0.0763	0.55078 0.2574	0.78370 0.0835	0.63775 0.1731	0.17655 0.7379	0.08571 0.8717	0.69825 0.1228	0.88041 0.0206	0.35309 0.4924	-0.14285 0.7872	-0.14286 0.7872	0.84067 0.0361
S20	0.65679 0.1565	0.11765 0.8243	0.88235 0.0199	0.91176 0.0113	-0.49259 0.3209	0.81168 0.0499	0.61604 0.1928	0.33882 0.5112	0.98518 0.0003	-0.28969 0.5774	0.14494 0.7841	0.05882 0.9119
S21	0.74688 0.0880	-0.09393 0.8595	0.70450 0.1161	0.87671 0.0219	-0.69921 0.1221	0.55549 0.2525	0.49187 0.3217	0.42629 0.3993	0.71510 0.1102	-0.74066 0.0922	0.46291 0.3652	0.18787 0.7215
S22	0.44137 0.3809	0.60876 0.1997	0.55078 0.2574	0.46382 0.3542	0.50022 0.3123	0.02857 0.9572	0.81969 0.0458	0.57682 0.2307	0.08827 0.8679	0.02857 0.9572	0.02857 0.9572	0.60876 0.1997
S23	0.38810 0.4471	0.66176 0.1523	0.77941 0.0676	0.58824 0.2194	0.40303 0.4282	0.49281 0.3206	0.83166 0.0401	0.40043 0.4315	0.58215 0.2284	0.37685 0.4615	-0.23191 0.6584	0.30882 0.5515
S24	0.50752 0.3041	0.23529 0.6536	0.79412 0.0592	0.67647 0.1401	-0.19405 0.7126	0.63775 0.1731	0.49283 0.3206	0.33882 0.5112	0.89562 0.0158	0.11595 0.8268	-0.31887 0.5379	0.11765 0.8243
S25	0.20898 0.6911	-0.22059 0.6745	0.25000 0.6328	0.14706 0.7810	0.04478 0.9329	-0.20292 0.6998	0.09241 0.8618	0.21561 0.6816	0.31347 0.5452	0.20292 0.6998	-0.92763 0.0077	0.13235 0.8026
AV	0.58849 0.2192	0.66674 0.1481	0.92763 0.0077	0.81168 0.0499	0.17655 0.7379	0.65714 0.1562	0.94112 0.0051	0.51610 0.2946	0.70619 0.1168	0.08571 0.8717	0.08571 0.8717	0.37685 0.4615

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S1	-0.08827 0.8679	0.25376 0.6276	-0.17655 0.7379	-0.49259 0.3209	0.20898 0.6911	0.97101 0.0012	0.76504 0.0763	0.65679 0.1565	0.74688 0.0880	0.44137 0.3809	0.38810 0.4471	0.50752 0.3041
S2	-0.02899 0.9565	0.75000 0.0859	0.20292 0.6998	0.60294 0.2052	0.60294 0.2052	0.23191 0.6584	0.55078 0.2574	0.11765 0.8243	-0.09393 0.8595	0.60876 0.1997	0.66176 0.1523	0.23529 0.6536
S3	0.37685 0.4615	0.58824 0.2194	0.40584 0.4247	-0.26471 0.6122	0.60294 0.2052	0.81168 0.0499	0.78370 0.0835	0.88235 0.0199	0.70450 0.1181	0.55078 0.2574	0.77941 0.0676	0.79412 0.0592
S4	0.37685 0.4615	0.48529 0.3292	0.31887 0.5379	-0.35294 0.4926	0.58824 0.2194	0.81168 0.0499	0.63775 0.1731	0.91176 0.0113	0.87871 0.0219	0.46382 0.3542	0.58824 0.2194	0.67647 0.1401
S5	0.14712 0.7809	0.56723 0.2404	0.20597 0.6954	0.80606 0.0528	0.28361 0.5860	-0.29424 0.5714	0.17655 0.7379	-0.49259 0.3209	-0.69921 0.1221	0.50022 0.3123	0.40303 0.4282	-0.19405 0.7126
S6	0.48571 0.3287	0.37685 0.4615	0.71429 0.1108	-0.02899 0.9565	0.66674 0.1481	0.14286 0.7872	0.08571 0.8717	0.81168 0.0499	0.55549 0.2525	0.02857 0.9572	0.49281 0.3206	0.63775 0.1731
S7	0.57682 0.2307	0.92406 0.0084	0.51610 0.2946	0.24642 0.6379	0.89326 0.0165	0.57682 0.2307	0.69825 0.1228	0.61604 0.1928	0.49187 0.3217	0.81969 0.0458	0.83166 0.0401	0.49283 0.3206
S8	-0.33395 0.5177	0.30802 0.5526	-0.39466 0.4387	-0.27722 0.5948	0.09241 0.8618	0.94112 0.0051	0.88041 0.0206	0.33882 0.5112	0.42629 0.3993	0.57682 0.2307	0.40043 0.4315	0.33882 0.5112

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24
S9	0.52964 0.2798	0.22391 0.6698	0.61791 0.1911	-0.53737 0.2715	0.40303 0.4282	0.52964 0.2798	0.35309 0.4924	0.98518 0.0003	0.71510 0.1102	0.08827 0.8679	0.58215 0.2254	0.89562 0.0158
S10	0.31429 0.5441	0.23191 0.6584	0.54286 0.2657	0.49281 0.3206	0.08697 0.8699	-0.54286 0.2657	-0.14286 0.7872	-0.28989 0.5774	-0.74066 0.0922	0.02857 0.9572	0.37685 0.4615	0.11595 0.8268
S11	-0.20000 0.7040	0.23191 0.6584	-0.14286 0.7872	0.40584 0.4247	0.52179 0.2883	-0.02857 0.9572	-0.14286 0.7872	0.14494 0.7841	0.46291 0.3552	0.02857 0.9572	-0.23191 0.6584	-0.31887 0.5379
S12	-0.49281 0.3206	0.30852 0.5515	-0.55078 0.2574	-0.07353 0.8899	0.01471 0.9779	0.81168 0.0499	0.84067 0.0361	0.05882 0.9119	0.18787 0.7215	0.60876 0.1997	0.30882 0.5515	0.11765 0.8243
S13	1.00000 0.0000	0.46382 0.3542	0.88571 0.0188	0.02899 0.9565	0.57977 0.2278	-0.02857 0.9572	0.02857 0.9572	0.49281 0.3206	0.24689 0.6372	0.25714 0.6228	0.52179 0.2883	0.43483 0.3889
S14	0.46382 0.3542	1.00000 0.0000	0.40584 0.4247	0.57353 0.2340	0.88235 0.0199	0.37685 0.4615	0.63775 0.1731	0.27941 0.5918	0.18787 0.7215	0.89865 0.0149	0.76471 0.0765	0.22059 0.6745
S15	0.88571 0.0188	0.40584 0.4247	1.00000 0.0000	0.05798 0.9131	0.55078 0.2574	-0.14286 0.7872	-0.02857 0.9572	0.55078 0.2574	0.12344 0.8158	0.08571 0.8717	0.60876 0.1997	0.60876 0.1997
S16	0.02899 0.9565	0.57353 0.2340	0.05798 0.9131	1.00000 0.0000	0.50000 0.3125	-0.40584 0.4247	-0.05798 0.9131	-0.48529 0.3292	-0.42270 0.4037	0.40584 0.4247	0.08824 0.8680	-0.51471 0.2961
S17	0.57977 0.2278	0.88235 0.0199	0.55078 0.2574	0.50000 0.3125	1.00000 0.0000	0.23191 0.6584	0.34786 0.4993	0.48529 0.3292	0.45401 0.3658	0.63775 0.1731	0.58824 0.2194	0.22059 0.6745
S18	-0.02857 0.9572	0.37685 0.4615	-0.14286 0.7872	-0.40584 0.4247	0.23191 0.6584	1.00000 0.0000	0.88571 0.0188	0.57977 0.2278	0.61721 0.1917	0.60000 0.2080	0.52179 0.2883	0.52179 0.2883
S19	0.02857 0.9572	0.63775 0.1731	-0.02857 0.9572	-0.05798 0.9131	0.34786 0.4993	0.88571 0.0188	1.00000 0.0000	0.37685 0.4615	0.27775 0.5941	0.82857 0.0416	0.75370 0.0835	0.49281 0.3206
S20	0.49281 0.3206	0.27941 0.5918	0.55078 0.2574	-0.48529 0.3292	0.48529 0.3292	0.57977 0.2278	0.37685 0.4615	1.00000 0.0000	0.81409 0.0486	0.14494 0.7841	0.54412 0.2644	0.82353 0.0440
S21	0.24689 0.6372	0.18787 0.7215	0.12344 0.8158	-0.42270 0.4037	0.45401 0.3658	0.61721 0.1917	0.27775 0.5941	0.81409 0.0486	1.00000 0.0000	0.15430 0.7704	0.14090 0.7900	0.37573 0.4629
S22	0.25714 0.6228	0.89865 0.0149	0.08571 0.8717	0.40584 0.4247	0.63775 0.1731	0.60000 0.2080	0.82857 0.0416	0.14494 0.7841	0.15430 0.7704	1.00000 0.0000	0.69573 0.1248	0.14494 0.7841
S23	0.52179 0.2883	0.76471 0.0765	0.60876 0.1997	0.08824 0.8680	0.58824 0.2194	0.52179 0.2883	0.75370 0.0835	0.54412 0.2644	0.14090 0.7900	0.69573 0.1248	1.00000 0.0000	0.75000 0.0859
S24	0.43483 0.3889	0.22059 0.6745	0.60876 0.1997	-0.51471 0.2961	0.22059 0.6745	0.52179 0.2883	0.49281 0.3206	0.82353 0.0440	0.37573 0.4629	0.14494 0.7841	0.75000 0.0859	1.00000 0.0000
S25	0.34785 0.4993	-0.02941 0.9559	0.26090 0.6175	-0.52941 0.2801	-0.29412 0.5715	0.34786 0.4993	0.40584 0.4247	0.19118 0.7167	-0.16090 0.7900	0.17393 0.7417	0.47059 0.3462	0.57353 0.2340
AV	0.48571 0.3287	0.81168 0.0499	0.54286 0.2657	0.05798 0.9131	0.75370 0.0835	0.65714 0.1562	0.77143 0.0724	0.72471 0.1032	0.46291 0.3552	0.71429 0.1108	0.92763 0.0077	0.72471 0.1032

SPEARMAN RANK CORR. FACTORS 15:25 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 6

	S23	AV
S1	0.20898	0.58849
	0.6911	0.2197
S2	-0.22059	0.56674
	0.6745	0.1481
S3	0.25000	0.92763
	0.6328	0.0077
S4	0.14706	0.81168
	0.7810	0.0499
S5	0.04478	0.17655
	0.9329	0.7379
S6	-0.20292	0.65714
	0.6999	0.1562
S7	0.09241	0.94112
	0.8618	0.0051
S8	0.21561	0.51610
	0.6815	0.2946
S9	0.31347	0.70619
	0.5452	0.1158
S10	0.20292	0.08571
	0.6999	0.8717
S11	-0.92763	0.08571
	0.0077	0.8717
S12	0.13235	0.37685
	0.8025	0.4615
S13	0.34785	0.48571
	0.4993	0.3287
S14	-0.02941	0.81168
	0.9559	0.0499
S15	0.26090	0.54286
	0.6175	0.2657
S16	-0.52941	0.05798
	0.2801	0.9131
S17	-0.29412	0.75370
	0.5715	0.0835

SPEARMAN RANK CORR. FACTORS 15:25 TUESDAY, SEPTEMBER 13, 1983

SPEARMAN CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 6

	S25	AV
S18	0.34786 0.4993	0.65714 0.1562
S19	0.40584 0.4247	0.77143 0.0724
S20	0.19118 0.7167	0.72471 0.1032
S21	-0.14090 0.7900	0.46291 0.3552
S22	0.17393 0.7417	0.71429 0.1108
S23	0.47059 0.3462	0.92763 0.0077
S24	0.57353 0.2340	0.72471 0.1032
S25	1.00000 0.0000	0.23191 0.6584
AV	0.23191 0.6584	1.00000 0.0000